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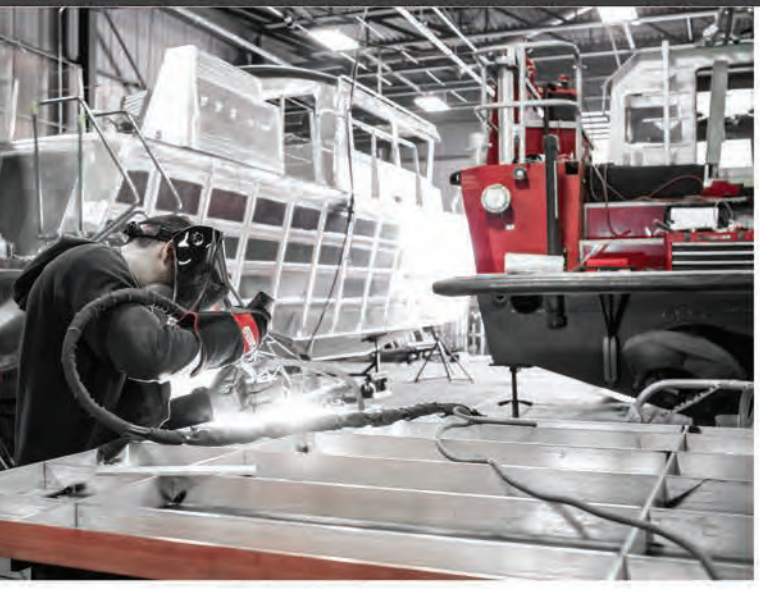

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Features

ON THE COVER

Despite the dearth of incentives and financial backing necessary for research into improving response capabilities – especially in the Arctic – progress is being made. In this edition, two different stories highlight ongoing research, testing and triumphs on the water. Coverage begins on page 20.

(Image credit: MPC)

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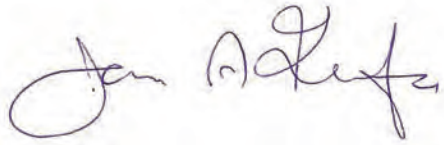
Editorial Calendars are designed and printed for a reason: we want our marine industry workboat readers – *the largest confirmed subscriber base in this genre* – to know exactly what is coming in a particular edition. Sure, current events can throw you a change-up every now and then. Nevertheless, if you turn these pages looking for salvage, spill response and/or Arctic operations wisdom, then you came to the right place. Throw into that mix the always interesting topic of special purpose workboats, and you've got all the ingredients for a terrific read.

Starting with the leadership of both the American Salvage Association (ASA) and the International Salvage Union (ISU), we kick off with a situation report on the state of salvage and response regulations, business models, liability issues and everything else in between. Both Todd Schauer and John Witte are familiar stakeholders in the salvage and response arena and you'll soon discover that the concerns of international and domestic salvors are remarkably similar. And, that the job of any response provider isn't getting any easier.

Separately – but nevertheless inextricably linked to the salvage and response game – the effort to develop new technologies for spill response, especially where those tools impact Arctic and/or cold weather operations, has long been hindered in the United States. Environmental and regulatory concerns sometimes prevent stakeholders from carrying out realistic drills and/or developing cutting edge spill response equipment. That's beginning to change. The U.S. Coast Guard's Research and Development Center (RDC) and Ohmsett – the National Oil Spill Response Research and Renewable Energy Test Facility – are two major reasons why. In this edition, we talk about recent developments at both locations. The first story begins on page 20.

It is easy to write off the Arctic as a place where the promise of sustained, and profitable energy exploration, shipping and commercial workboat operations simply hasn't come to fruition. Actually, nothing could be further from the truth. That's because some of the most innovative workboats on the planet are being designed precisely for this environment and the spill response folks mentioned above are targeting their efforts in order to meet the growing need for cold weather response capabilities. Both sectors, as it turns out, go hand in hand.

Make no mistake about it: there is risk in the Arctic. And no one outlines that risk any better than Dagmar Etkin, who has spent the better part of her impressive career studying oil spills and the impact of those events on both the environment and industry itself. Starting on page 42, she lays out the current situation in the Arctic in plain enough language and as always, backed up with solid data. Hence, the efforts of industry advocates like Brigham McGown and NOIA's Randall Luthi are critically important to reminding everyone – including the policymakers in Washington – that the pause in action up north should be considered just that – a temporary lull. The marine industry is coming back. When it does, the groundwork for safe and environmentally correct operations will have been laid.



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Towing Industry Safety – AWO & USCG Joint Analysis … By the Numbers

For 16 years, the National Quality Steering Committee has used three measures to track overall trends in safety and environmental protection. While not all-encompassing, the measures are considered to be useful indicators of towing industry trends. The measures are:

- *Crew fatalities per 100,000 towing industry workers.*
- *Gallons of oil spilled from tank barges per million gallons transported.*
- *The number of vessel casualties (overall or by incident severity).*

This report contains towing industry data and measures for calendar years 1994 to 2015. This report also includes summary statistics on crew member injuries, which the National Quality Steering Committee began tracking in 2006, for calendar years 2006 to 2015. Without a doubt, the Coast Guard and the American Waterways Operators (AWO) do a fine job interpreting the data.

Crew Fatalities: In 2015, there were six crew fatalities. There were a total of ten towing vessel deaths reported to the Coast Guard, but only six were directly related to towing vessel operations. The other four deaths were attributed to existing medical conditions (2) and natural causes (2). Of the six crew fatalities, three were the result of crew members falling into the water. The largest number of crew fatalities is attributed to falls overboard (75 of 150, 50%). The next largest group of fatalities is attributed to asphyxiation (23 of 150, 15%).

Oil Spill Volumes: According to Coast Guard records, 147,070 gallons of oil was spilled as a result of 68 tank barge pollution incidents in 2015. Chart 5 shows the total gallon quantity of oil spilled from tank barges for calendar years 1994 to 2015. The largest spill of 120,000 gallons was the result of a collision involving the uninspected towing vessel (UTV) PB SHAH, UTV DEWEY R and their accompanying barges, which took place on the Lower Mississippi River. The collision resulted in the release of nearly all the slurry oil from one tank on the barge APEX 3508. This spill accounted for 82% of the total volume spilled in 2015. The second largest spill of 22,000 gallons was the result of the UTV PECOS, which was pushing two LNG barges, alliding with a moored tank barge. The allision resulted in the release of naphtha into the Houston Ship Channel. This spill counted for 15% of the total volume spilled in 2015. These two spills accounted for 97% of the total volume of oil spilled from tank barges in 2015.

Oil Spill Rate: The oil spill rate for 2015 is projected to be approximately one gallon of oil spilled per 521,000 gallons transported, or 1.92 gallons of oil spilled per million gallons transported. Chart 6 shows the oil spill rate from 1994 to 2015. The tank barge oil spill rate is calculated using Coast Guard spill data, along with data from the annual U.S. Army Corps of Engineers (ACOE) publication "Waterborne Commerce of the United States," Part 5, Table 2-3. The latest version of the publication is for calendar year 2014. As such, the 2015 spill rate is a projection based on 2014 data. For 2014, the ACOE reported 76.4 billion gallons of oil transported by barge, representing 82.4% of all oil carried on domestic waterways. In 2014, the amount of oil transported by barge increased by 5.8 million short tons or 1.6 billion gallons. This represents a 2.1% increase over 2013.

Severity of Vessel Incidents: Towing vessel incidents include all reportable marine casualties that involve a towing vessel or barge. Each incident is counted only once, regardless of the number of vessels involved or events recorded. In 2015, 84% of towing vessel casualties were classified as low severity incidents. Medium and high severity incidents represented 6% and 10% of all incidents, respectively.

From 2014 to 2015, there was a significant decrease (34%) in all incidents recorded. A decrease in number of incidents was also observed in other industry segments (i.e. passenger vessels), and the Coast Guard will continue to analyze the data to determine causes for this phenomenon. While the total number of towing vessel incidents decreased by 34% from 2014 to 2015, the total number of medium and high severity incidents only decreased by 6.5%. A change in Coast Guard reporting requirements – NVIC 15-01 – is thought to have impacted the numbers. Notably, 31% of medium & high severity incidents began with an allision. Material failure was the first event in 20% of marine casualties.

Crew Member Injuries: In 2005, the Coast Guard began documenting injury severity with each incident investigation. In 2015 there were 109 injuries to crew members where the "vessel class" or "vessel service" was recorded as "towing vessel" or "barge." In 2015, there were only three incidents where more than one crew member was injured (one allision, two collisions). The most crew members injured in a single accident was four. In the god news department, there was a significant (34%) decrease in serious, severe and critical injuries between 2014 and 2015. From 2006 to 2015, 71% of injuries were minor or moderate in severity. 2015 data – where 73% of crew member injuries were minor or moderate in nature – compares well to the long term trend. Chart 10 shows injury data by severity and accident type. The accident types most commonly associated with higher severity injuries include falling onto a surface, line handling and/or getting caught in lines, being struck by a moving object, and/or being crushed between objects.

Chart 1 - Crew Fatalities by Calendar Year

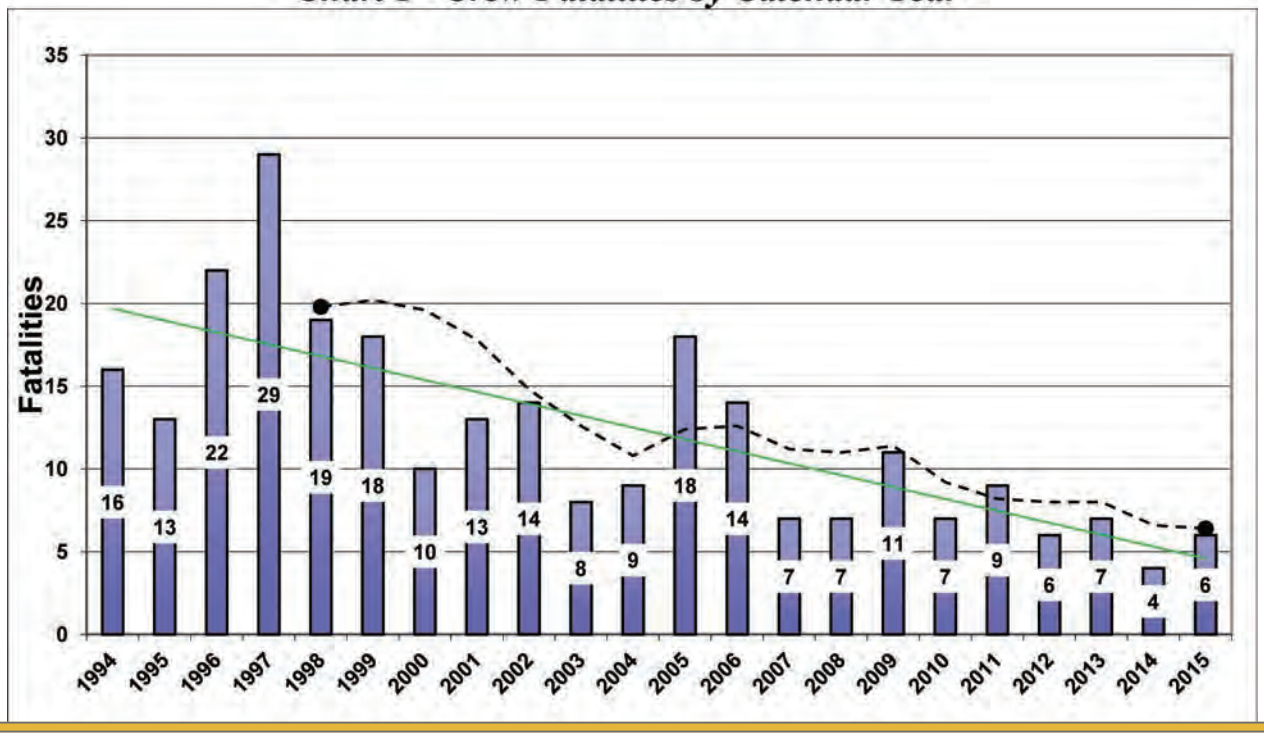
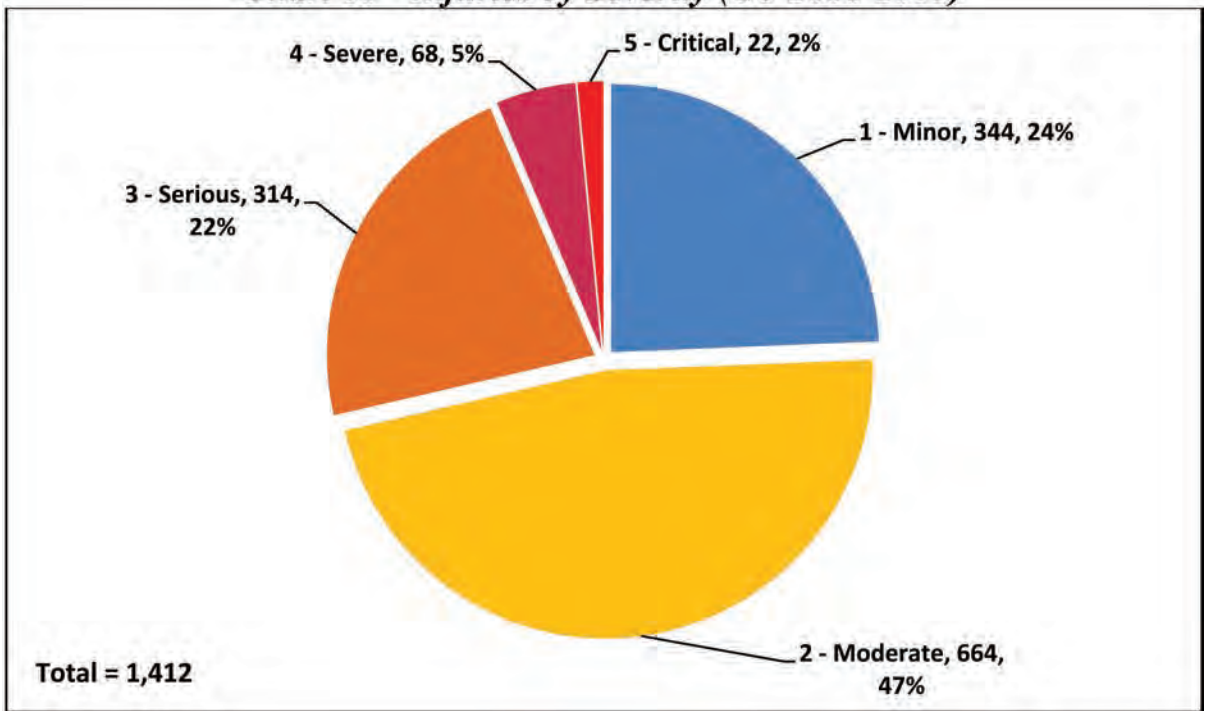


Chart 10 - Injuries by Severity (CY 2006-2015)



The Full report can be found at:
https://www.uscg.mil/hq/cg5/cg545/docs/CGAWO03Aug16.pdf

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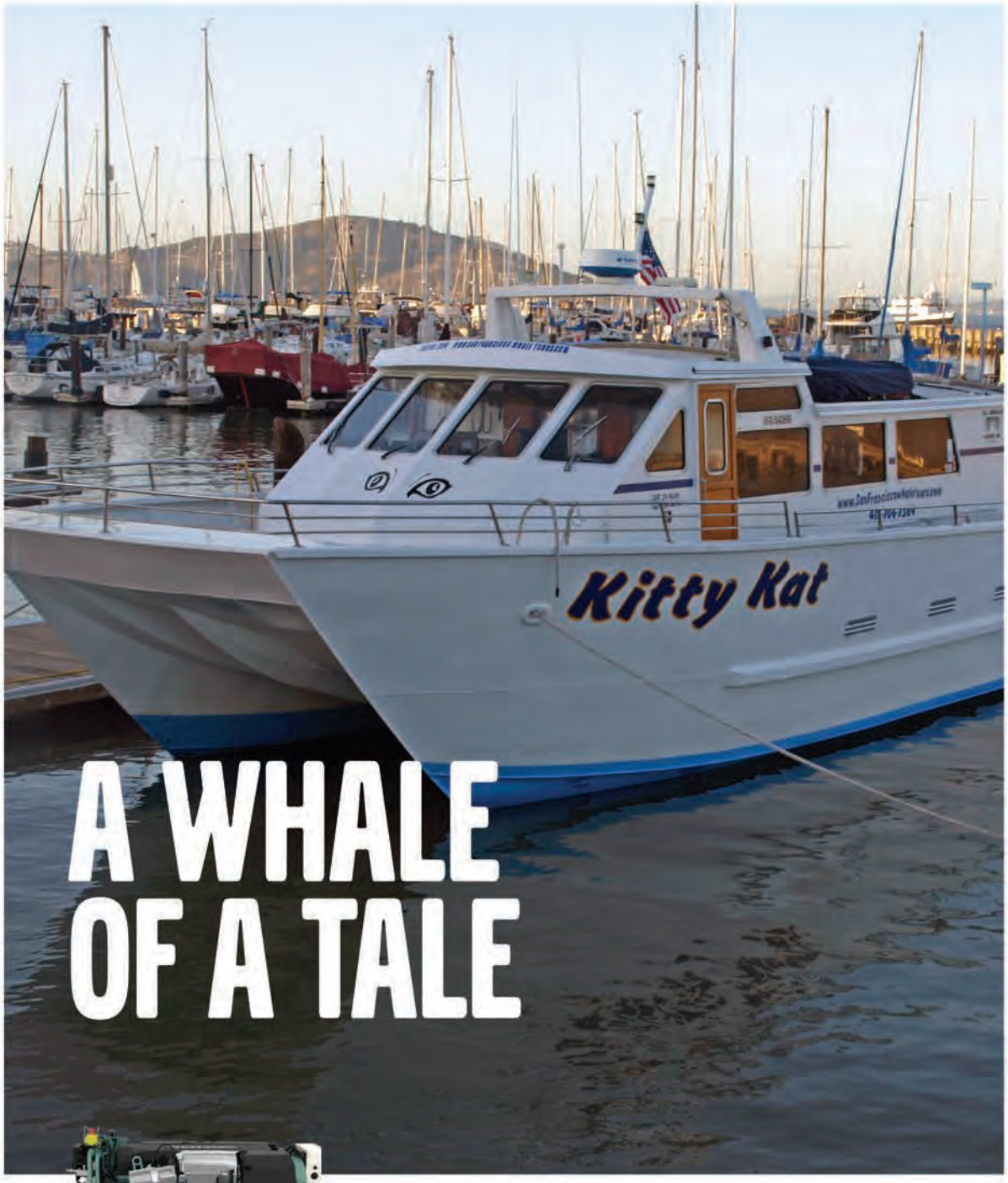

A WHALE OF A TALE

On the tourist packed San Francisco Fisherman's Wharf, an inoperable sightseeing boat isn't an option. When the time came for San Francisco Whale Tours to repower their flagship boat, *Kitty Kat*, they chose a pair of Volvo Penta D11-625's for reliability and passenger comfort.

"Our customers could tell the difference right away. With no fumes on deck, we're getting fewer cases of seasickness in the open ocean," reports Capt. Joe Nazar. Repowering with Volvo Penta has also bolstered profitability: "I don't go to the fuel dock as often, and that goes straight to the bottom-line."

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VOLVO PENTA

President, American Salvage Association

Todd Schauer is Director of Operations at Resolve Marine Group, as well as President of the American Salvage Association. After graduating from the U.S. Coast Guard Academy with a degree in Naval Architecture in 1991, he followed that up with graduate degrees in Naval Architecture, Marine Engineering and Mechanical Engineering from the University of Michigan. And, while his considerable U.S. Coast Guard experience includes shipboard engineering, marine safety, advanced engineering and emergency response, he is best known for his longtime role in the commercial salvage business. Schauer possesses more than 25 years of success as a Project Manager, Salvage Master, Naval Architect, and Marine Engineer; including 20 years of salvage related experience, underscored by five years of service on the USCG Salvage Emergency Response Team (SERT), including acting as Team Leader. Simply put, this salvage and response professional has done it all. Today, he is directly responsible for Resolve's global salvage, wreck removal and firefighting operations. His most recent major project accomplishments include wreck remediation of the M/V Rena and the Ro/Ro Amadeo 1 wreck removal. The American Salvage Association (ASA) is indeed fortunate to have him at the helm, and *MarineNews* is similarly grateful to have him weigh in on the hottest response topics of the day. Listen in as Todd Schauer schools us on 'all things salvage.'

Give us an overview of the Salvage Industry in 2016 – the good and the bad – domestically and across the globe. What's the number one thing on your plate today?

The salvage industry is under a lot of pressure in 2016. In addition to a declining number of ship casualties, salvors are not immune from the economic trends of shipping and offshore markets which are clearly dismal in many sectors. While not directly linked to oil and gas, many salvors are diversified into offshore services, platform decommissioning, offshore towing, etc. and this business has slowed remarkably. It is a very tight market and there is fierce competition for the work that is available. Concurrently in the U.S., there is the added pressure of increased regulations including the recent entry into force of the NPREP Guidelines which represent a substantial increase in the frequency and complexity of salvage and marine firefighting (SMFF) drills and exercises required for all ships. The U.S. Coast Guard has also commenced another strict round of verifications for required SMFF capability that is generating some stress and may require additional spending. In short, salvors are going through a difficult phase. If there is good news, I guess it's that you don't have to look very far to other shipping segments to find that things could be much worse. While I understand that the situation we are in is market driven, I do struggle to accept the imbalances that exist. Considering the broad range of emergency and wreck removal services that the salvage industry provides worldwide with an "any problem, anywhere, anytime" mindset and capability including fully developed systems of response professionals and equipment, it isn't hard to imagine how the industry can be under so much pressure. The extreme value of our small industry to the shipping community, the environment and the public good is exceptional and this value seems greatly unbalanced compared with the returns that exist in the current market and the foreseeable future.

Wreck remediation of M/V Rena off New Zealand

Credit: Todd Schauer/Resolve Marine

The LOF – are clients warming up to it? How widespread is its use? What is its future? What if it goes away – what is the ultimate impact on the salvage business?

I don't think clients are warming up to the LOF and the opposite may well be true. What is getting lost by the reluctance to utilize the LOF is the concept of duly rewarding salvors for taking risks and also the incentive for salvors to re-invest in response capability and equipment. Taken at a time when salvors are facing extreme response challenges including mega ship salvage issues, deep water salvage and pollution mitigation requirements, and the proliferation of LNG vessels, mega passenger vessels, etc., the need for re-investment has never been higher to assure that proper response capability exists. Unfortunately, I believe that many owners and underwriters have a short term focus driven by quarterly reports and it will likely take some very expensive incidents such as mega containership groundings without the necessary container lightering capability to highlight the need to properly incentivize salvors via pure salvage contracts and other means to develop the requisite tools to meet the demands of the rapidly changing shipping industry.

Market pressures have prompted both consolidation and diversification among the salvors. Tell us why, how and where this is happening.

Consolidation is the recent story of the industry. Salvors all carry very large overheads in the form of personnel, facilities and portable and floating equipment at the ready for emergencies. We are living in a time of declining casualties and at the same time, heightened regulations and requirements for prompt and effective response. Further, the size and complexity of ships and cargo continues to grow putting further pressure on salvors to be prepared for all variety of issues. Something has to give and recently it has been the number of players in the market. Diversification has been instrumental for many companies to stabilize cash flow. I think we will continue to see dynamic moves within the industry and those with the best models for survival will emerge strong.

Can U.S. responders compete on a level playing field in the international salvage markets? Give us a garden variety example of where this has occurred.

Without a doubt the U.S. responders can compete in the international market and do so every day. In fact, our U.S. based ASA members represent a very large percentage of the major international salvors. Notable recent jobs performed by our members include the Costa Concordia in Italy, the Rena in New Zealand, the Baltic Ace removal project in the North Sea, and the Amadeo 1 removal from Southern Chile. The competitiveness of these salvage companies on the world scale is a tribute to their strength, capability and global network. Being better, smarter, faster, and more cost

effective are all essentials to winning major international contracts; for those reasons, I believe that the heightened demands of operating in the U.S. system have directly aided the U.S. companies in competing internationally.

At one point, no SMFF retainer fees were being charged by Core Providers for non-tank vessels. As the number of U.S. salvage emergencies – the traditional source of revenue for salvors – continues to decline, can U.S. salvors sustain that business model?

I do not believe that the U.S. response model for salvage and firefighting can be sustained without some level of subsidizing – you simply can't maintain the best response capability in the world based on declining emergencies and, subsequently declining revenue. The race to the bottom in retainer pricing that occurred at the implementation of the SMFF rules when Core Providers were trying to grab market share is effectively over and we are already seeing a correction to increased retainer fees for this response capability.

Sum up the so-called 'U.S. Response Model' in a nutshell. Is it relevant in other parts of the world? Do you envision this model gaining traction internationally?

The U.S. Response Model for casualty response is a system of many interacting components that ensures a proper response occurs in line with national priorities when a casualty occurs. This includes a national framework of laws and response protocol (administered by federal and state agencies) addressing many preparedness and response issues, responsible owners and operators that operate in U.S. waters, and the response industry that stands at the ready. There are many highlights of this system including a well rehearsed Incident Command System (ICS), strictly enforced requirements for financial responsibility (COFR's), and U.S. Coast Guard prescribed and vetted standards for spill response, salvage and firefighting responders along with pre-agreed response contracts. An additional major benefit of the U.S. Model is the funding mechanism that is available through the Oil Spill Liability Trust Fund to handle situations where the resources of the responsible party are exceeded or limits of liability have been reached. There are many other features of the system and while not every aspect may be viewed positively by every stakeholder, there can be no argument that the system is not effective or that the U.S. is not prepared to respond to a major incident. One physical testament to the U.S. system

Credit: Todd Schauer/Resolve Marine

is essentially the wreck-free nature of U.S. waterways – while not perfect, it is a starkly positive contrast to the ports and waters of many developing countries that can be found littered with wrecks, many of which can be witnessed to be actively polluting. In the ASA's continued outreach efforts, including our expansion throughout the Americas, we highlight the benefits of an advanced response model and share lessons learned from the international experience of our members as well. Be assured that there are many developing countries struggling with the basics of such a system and without the proper laws and structure to enforce simple things such as pollution response, COFR's or wreck removal orders. Business issues aside, we all have an obligation to preserve and protect the environment of our sensitive planet and the ASA is pleased to promote such efforts.

In 2013, NOAA submitted a report to the U.S. Coast Guard after completing an assessment of known and potentially polluting sunken wrecks in U.S. waters, known as the Remediation of Underwater Legacy Environmental Threats (RULET) project. This report identified 17 high risk wrecks that were recommended for further assessment and potential oil removal. Has any action been taken to address these high risk wrecks?

We have been waiting for action from the U.S. Coast Guard since the time this report was published. Quite frankly, the ASA is very disappointed that the Coast Guard has taken no action to address these wrecks which clearly represent a substantial threat of pollution. Further, we are aware of some of these wrecks that are actively leaking oil. While these submerged projects can be challenging, this is exactly the kind of environmental protection work where our ASA members thrive. Further, the Coast Guard has a process and a ready source of funding for handling such assessment and removal operations within the Oil Spill Fund. We do not understand the inaction for the past three years. When one of these aging wrecks inevitably spills a load of oil, the Coast Guard will have a lot of explaining to do to the public.

Offshore Energy:

a Golden Opportunity for Alaska and the United States

By Brigham A. McGown

McGown

As we enter the final quarter of the year, one of the last and most pressing pieces of business facing the Interior Department is to finalize its next offshore leasing program, which will specify exactly which parts of the United States' Outer Continental Shelf will be open to oil and gas development between 2017 and 2022.

Having already cut the Atlantic from its proposed program back in March, the smoke signals coming from Washington suggest that the Administration is now considering doing the same with the two proposed Arctic lease sales, leaving the Gulf of Mexico as the only area of America's OCS open for offshore energy development.

Such a decision would have wide ranging and significant implications for a number of maritime industries. That's because of all of the places around the world where the oil and gas industry operates; there are few which will require more equipment and support services than the Arctic.

To take Shell's previous campaign in the Chukchi Sea as a single example, it included two icebreakers, two drilling units, two ice management vessels, three anchor handlers, three offshore support vessels, two oil spill response tugs, three helicopters and three aircraft - including one solely dedicated to ice reconnaissance, all part of a flotilla which numbered more than 30 boats and aircraft.

Credit: Shell & Brigham McGown

The ripple effects of offshore drilling in the Arctic extend far beyond the region however, creating opportunities thousands of miles away, from Seattle to Maine and beyond. Ports in the Puget Sound area, a maritime and industrial hub that has supported resource development in Alaska for more than a hundred years, host many of the support vessels bound for the Arctic. Stevedores, electricians, welders, engineers, hydraulic technicians and equipment operators there, will all play an essential role in preparing the different vessels by providing fuel, specialized equipment and repair and maintenance services. In total, Shell spent $313 million supporting its Alaska program there, between 2006 and 2014.

Importantly, energy development in the Arctic could also play a major role in bolstering Alaska's offshore infrastructure. In a 2015 Department of Energy commissioned report on the subject; the National Petroleum Council noted the "many synergies between the types of infrastructure that would facilitate Arctic oil and gas exploration and development and the infrastructure needs of local communities, the state of Alaska, and elements of the U.S. Forces such as the Coast Guard and Navy."

These synergies have played out in real time on at least two occasions in recent years, when the Coast Guard has had to rely on industry to conduct rescue missions for other vessels stranded in the area. As a former Mayor of Dutch Harbor surmised the situation, "Shell's substantial support vessels are some of the only emergency response assets we have in the Arctic now." Make that had in the Alaskan Arctic.

This argument is true for all facets of Arctic infrastructure, but is especially worth noting in the case of oil spill response. It's only through investment by industry that the Arctic will develop a comprehensive international spill prevention and response plan. That may sound counterintuitive, but there is a real need for such an agreement; Russia and other countries continue to develop their own Arctic resources and at present there is very little in the way of an integrated, international response strategy.

Oil spills do not respect international boundaries clearly, so the United States should lead the way in creating a robust set of regulations which lay out exactly how industry must respond in the event of a spill. We can only claim a

mandate to develop those if we allow development in our own section of the Arctic.

A first step towards that goal may have come with the Administration's recent announcement of region specific Arctic offshore drilling regulations. While some of these regulations will likely need to be adjusted as new technologies come on line, they hopefully mark a start in the process of finding the delicate but essential balance between resource development and conservation. As numerous Native groups have argued, the two are not mutually exclusive; if anything they are the twin pillars which will be vital to support local Alaskan communities in the future.

The critical point is that the Administration should be looking for ways to stimulate, not impede, industry from making investments in the Arctic. Given the very long lead in times needed to develop offshore resources – at least a decade according to most industry experts – cutting the leases will have precisely the opposite impact. Not only will it effectively ban any offshore activity in the region for the next 20 years, it will start a domino effect across a host of maritime and support services, derailing Alaska's economy and symbolically hanging a "Closed for Business" sign on the door.

Conversely including the Arctic in the final plan will help to safeguard the region's future, facilitating investment by multiple Government departments and providing a justification for the private sector to continue to build out the State's infrastructure all the way through until the first proposed leasing round in 2020. Doing so will bring a swathe of benefits not just for local people, but for businesses and communities across the entire country. The Interior Department must embrace this golden opportunity.

Brigham A. McCown *has more than 25 years of executive management, legal, and operational experience at the local, national, and international levels of government. He previously served as the first acting administrator and interim CEO of the Pipeline and Hazardous Materials Safety Administration (PHMSA). While in this position, McCown was in charge of the federal government's oversight of more than one million daily shipments of hazardous materials by all modes of transportation, including pipeline. Mr. McCown graduated from Miami University in 1988 with a degree in diplomacy and foreign affairs and later went on to receive his law degree from Northern Kentucky University in 1997.*

Ohmsett: Advancing Spill Response

The National Oil Spill Response Research and Renewable Energy Test Facility has been an integral part of the spill response community for more than three and a half decades.

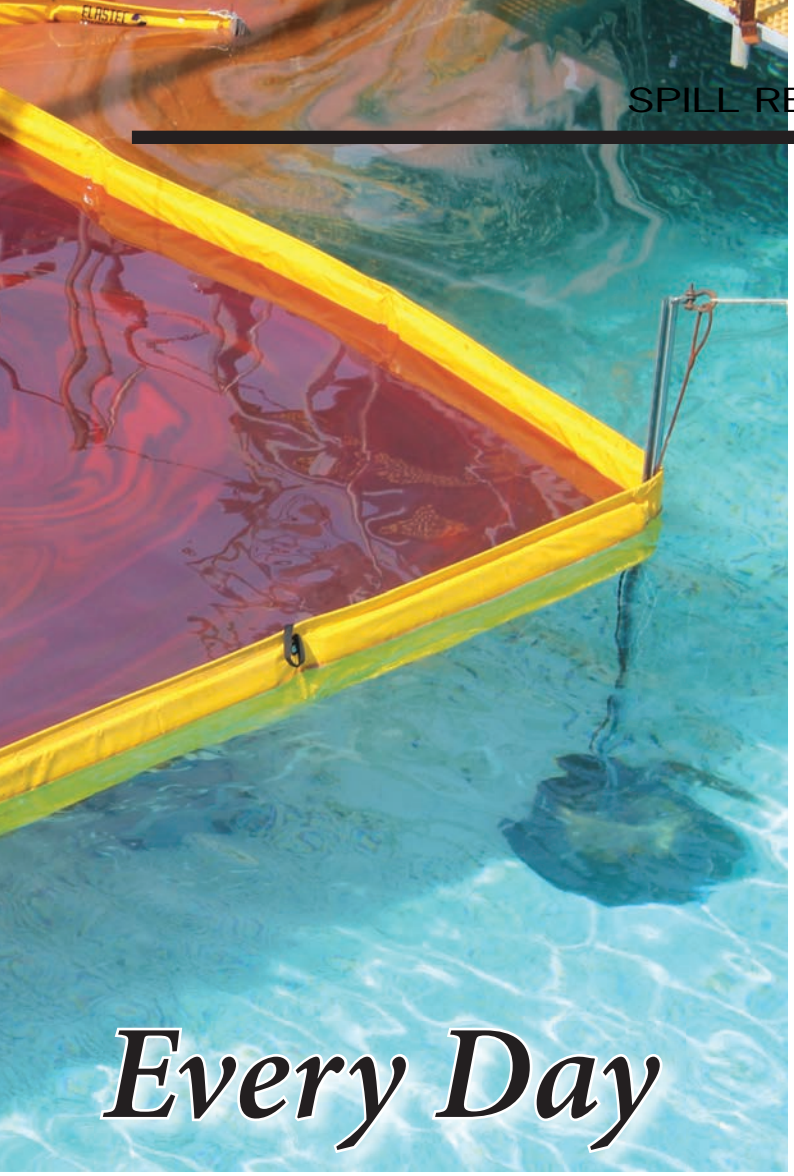
By Jane-Ellen Delgado

Tucked away on the shores of the Sandy Hook Bay in central New Jersey resides Ohmsett – The National Oil Spill Response Research and Renewable Energy Test Facility. It has been an integral part of the spill response community for more than three and a half decades. Government agencies, private industry, and oil spill response organizations from around the world have visited the facility for testing, research and training.

From booms, skimmers and dispersants, to cold water testing and Remotely Operated Vehicle evaluations, Ohmsett has assisted researchers and manufacturers in evaluating cutting edge technologies that are helping remove spilled oil from the worlds' oceans.

Managed by the U.S. Department of Interior's Bureau of Safety and Environmental Enforcement (BSEE) and operated through a contract with MAR (MD) LLC, Ohmsett is part of the Bureau's oil spill research program. Ohmsett directly supports BSEE's mission to ensure the best and safest oil spill detection, containment and removal technologies are available to protect the U.S. coastal and ocean environments.

***All images courtesy of OHMSETT**



A skimmer is tested in oil slick thicknesses ranging from 2-inches to 1/8-inch

Realistic Testing in World Class Facilities

At the heart of the facility is one of the largest outdoor saltwater wave/tow tank facilities in North America. It is the only facility where full-scale oil spill response equipment testing, research, and training can be conducted in a marine environment with oil under controlled environmental conditions.

The tank measures 203 meters long by 20 meters wide by 2.4 meters deep and is filled with 10 million liters of crystal clear saltwater. The three movable bridges are capable of towing equipment up to six knots to simulate towing at sea. A crow's nest mounted on the movable main bridge above the water provides a vantage point for mounting test equipment, such as sensors to remotely detect oil spills, as well as for video documentation of a test.

The facility is also equipped with a computerized wave generator capable of producing wave characteristics of 59 cm height (H1/3 at 7 meter wavelengths), 83 cm height (H1/3 irregular waves), and wavelengths up to 30 meters.

Ohmsett plays a critical role in providing full-scale evaluations of equipment and remediation techniques that enable rapid and efficient response to an actual spill. "We are the intermediate step between small-scale bench testing and open water testing," says Paul Meyer, BSEE's Ohmsett Manager. "With the ability to control the testing environment, we are able to provide repeatable test conditions. This way, any equipment modifications can be measured and compared with each test performed, giving our customers the opportunity to optimize equipment performance."

With a wide range of testing and research capabilities, the oil spill response community relies on Ohmsett for independent and objective testing. "Our staff of engineers and technicians assists customers with test protocol development, product evaluations, and provides improvement recommendations," says John Delia, MAR program manager for Ohmsett.

The Nuts & Bolts of Research & Testing

Over the years BSEE has funded multiple research projects at Ohmsett. Most recently, two highly successful projects conducted by BSEE were the Diminishing Slick Thickness test and the ICEHORSE Submersible Skimmer. Earlier this year, Ohmsett personnel conducted performance testing of two oleophilic skimming systems to better understand the relationship between Oil Recovery Rates and Recovery Efficiencies in varying oil slick thicknesses or diminishing slick thicknesses.

At Ohmsett, skimming systems are tested to the ASTM F2709, the standard for testing the performance of stationary skimmers in calm water conditions. However, the ASTM F2709 standard calls for testing in 3-2 inches of oil in order to create the ideal conditions necessary to measure a skimming system's maximum performance. But, in an actual oil spill it is likely that a skimmer will operate in a thinner range of oil thicknesses. In this test series, a drum and disc skimmer were tested to ASTM F2709, as well as in various other oil slick thicknesses ranging from 2-inches to 1/8-inch using standard refined test oil.

"This series of experiments was the first of its kind and represents a continuation of basic research data associated with quantifying skimmer performance with varying test parameters," stated Kristi McKinney, a BSEE project manager.

A significant oil spill response challenge is recovering oil in ice. While response equipment and techniques to contain and recover oil spills in the offshore Arctic re-

gions already exist, there remains a testing and evaluation requirement to determine how well they perform, and to help improve them for use in cold water and ice environments. As such, BSEE has dedicated resources to advance the knowledge of oil spill response capabilities in cold water and ice-infested environments.

"During the winter months, we can replicate cold climate conditions at Ohmsett by using a chilling system to regulate the water temperature in the test basin," stated Mr. Delia. "In addition, we place manufactured sea ice in the test tank to simulate an ice field in which response equipment will be operating."

The sea ice is sourced from the U.S. Army's Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) where it is manufactured or "grown" to support multiple Army research programs for extreme climates. Recently, however, Ohmsett staff engineers designed and developed a system for producing the ice blocks on-site. Frames were constructed at the facility, and chiller boxes maintained at 0º F were used for freezing and storage.

Using this new on-site capability for testing in a simulated Arctic environment, the staff created ice for a BSEE funded project to develop a new approach to how oil skimmer technologies are deployed in ice-infested waters. It is anticipated that the technology could potentially improve the response industry's ability to remove oil from otherwise inaccessible locations.

In 2014, Alion Science and Technologies of New London, Connecticut was tasked with developing a submersible skimming system that can be deployed from a vessel and maneuvered underwater to the location of the oil. In February 2016, the prototype system was tested in an oil and ice field at Ohmsett. The prototype, called the ICEHORSE, consists of a small smoothed drum skimmer and three ROVs mounted to an aluminum frame, with an ice cage to prevent ice from interfering with the oil recovery process.

The ICEHORSE was assessed on its ability to maneuver, travel speed, thrust, turning radius, and submerging and surfacing characteristics. After those initial tests, ice and diesel fuel oil (dyed red for visibility) were placed in a boomed test area to create a spill within broken ice. The skimmer system, initially located outside the test area, submerged, traveled underwater, and surfaced among the oil and ice to recover the oil.

"The submersible skimmer test successfully demonstrated the concept of operation. The prototype was able to successfully submerge, maneuver under the ice, surface within the field and recover diesel oil," commented Ms.

Ohmsett Testing Capabilities: at a glance ...

Oil spill skimmer systems	Dispersed, weathered & emulsified oil behavior	Containment booms
Remote sensing equipment	Cold weather & broken ice conditions	Dispersant testing
Test protocol development	Sorbents	Viscous oil pumping
Temporary storage devices	Surface & sunken oil, & neutrally buoyant plumes	Oil/water separators

The ICEHORSE surfaced among the oil and ice to recover the oil

McKinney. "Next steps will be to review test results with an eye towards future development of this concept."

BSEE Invests so that Industry can Succeed

For 35 years, Ohmsett has moved the ball forward in all aspects of spill response testing and research

With the new advances in technology for responding in ice conditions, BSEE has invested in the facility with newly developed equipment to measure oil slick thickness and ice coverage during testing. An acoustic tool adapted to operate from a ROV, detects oil in and under ice, tracks location, and measures thickness. The sensors provide real-time measurements of the slick thickness and include cameras for real-time viewing and recording.

To accurately and rapidly assess cold water and ice testing parameters such as total surface oil versus ice area coverage and oil layer thickness, a thermal imaging camera with processing software was developed specifically for use at Ohmsett. The Tactical Rapid Airborne Classification System (TRACS) creates images that separate ice, water and oil of several thicknesses based on differences in the thermal emittance.

Jane-Ellen Delgado *is the Senior Marketing Communications Specialist of the Ohmsett Facility. She has been with Ohmsett since 2004 managing the branding of the facility. Ms. Delgado holds an MBA in Marketing from the City University of Seattle, WA and a B.S. in Journalism from the State University of New York at Brockport. On the WEB:* ***www.ohmsett.com***

Fair Contracting in Casualty Response

ISU's President weighs in on the current state of international salvage, a changing landscape and the need for mutual fairness from all stakeholders in the global salvage and response arena.

By John Witte

Witte

The last three decades have seen a significant reduction in marine casualties which is to be welcomed by all. Better ships; better inspection and port state control; the SOLAS convention; improved operational practices, liability concerns – both civil as well as criminal – and better crew training have all played their part. Nevertheless casualties will continue to happen, largely because the human element is still the most important factor in maritime incidents. U.S. Coast Guard research shows that the root causes of more than 75% of casualties are human factors.

In today's highly regulated world, when there is a casualty, cooperation between all those involved in the response effort, is essential for success. Many different organizations have their part to play and may have differing perspectives, but they should share the same objective. At the heart of any salvage response is the marine salvor that must use "best efforts" to salve the vessel. In this regard, Salvors should really be described as "loss mitigation partners" because prevention, or reduction, of loss is the salvors' primary goal.

Salvage: A changing landscape

Recent years have seen major changes in the salvage industry. It is no longer normal practice for salvage operators to place salvage-specific vessels at strategic locations, waiting for their service to be called upon. The days of having a salvage tug "on-station" are over. The ownership of salvage companies has changed as well. Family owned firms used to dominate the industry. Today more salvage service providers are in public ownership or are subsidiaries of large international industrial groups. Planning for investment also remains difficult because of the fluctuations in income, which is the norm in the industry.

However, marine salvage remains a vibrant sector and the members of the International Salvage Union (ISU), the global trade association for the industry, stand ready around the world to intervene and provide a response to a casualty situation. The latest statistics from the ISU show that the total number of services recorded in 2015 was 212. It is the second highest total since 1999 – there were also 249 services in 2014.

Gross revenues for ISU members in 2015 from all activities were reported to be US $775 million in 2014, which was a slight decrease from the previous year. The number of operators has increased and in some parts of the world, such as Southeast Asia, it could be said there is over-capacity of salvage service providers. With shipping rates depressed and a low oil price making offshore assets readily available, for spot services, salvors are increasingly willing to work on commercial terms and day rates rather than using traditional contracts in an effort to keep their equipment and personnel working.

The traditional salvage contract is the Lloyd's Open Form (LOF). It is a "no-cure, no pay" contract under which the parties do not negotiate a price for the job but agree to settle the payment or "award" once the job is done, with the salvor entitled to a payment based on the value of the property (ship and cargo) saved from peril, taking account of the circumstances in which the service was provided. LOF has been in use in various editions for more than 100 years. However, it is used considerably less today than in the past.

While a good year as related to overall services provided, 2014 saw the lowest annual number of LOF cases on record – just 37. Revenue from Lloyd's Open Form (LOF) cases was US $83 million in 2015, not coincidentally the lowest in more than a decade. At the same time, revenue from operations conducted under contracts other than LOF was the second highest ever recorded at US $98 million and shows a gently rising trend. By comparison, a typical year in the early 1980's might have seen more than 200 LOFs. Salvors know that the days of more than 100 LOFs per year are long gone but the ISU believes that, in many situations, the LOF remains the best emergency response contract available today and has great benefits for both the owner and the salvor.

Best Practice: the LOF contract endures

It is a simple contract with pro-forma clauses and it enables rapid intervention without the delay of "up front" time consuming negotiations. Speed is nearly always critical in any response to an evolving casualty situation. And nearly all the commercial risk of the operation rests with the salvor.

The days of having a salvage tug "on-station" are over. The ownership of salvage companies has changed as well. Family owned firms used to dominate the industry. Today more salvage service providers are in public ownership or are subsidiaries of large international industrial groups. Planning for investment also remains difficult because of the fluctuations in income, which is the norm in the industry.

Since 1999, LOF has included the possibility of the incorporation of the so-called SCOPIC Clause (Special Compensation P&I Club Clause). This clause can be added to any LOF and then invoked by the salvor according to the circumstances. It allows for the salvor to be paid on a time and material basis if the chances of successfully salving the vessel are slim or if the salved values (hull and cargo) are likely to be low. In this way salvors are still encouraged to assist in cases in which the "no cure, no pay" principle might otherwise discourage them.

The fact that some 75% of LOFs are settled amicably indicates that the model works. Those that are not settled are handled by an established arbitration process. While the arbitration process has at times been considered slow, efforts are being made by Lloyds of London, the International Group of P&I clubs and involved organizations like the ISU, to streamline and speedup the process.

There is speculation in the industry about the reasons for the decline in the use of LOF. Some observers think that it is due to lack of understanding of the contract by some insurance underwriters and owners; a perception that it is too expensive and favors the salvor; while others are of the opinion that improved communications and management practice means that decisions that were once taken by the master of the distressed vessel are now taken ashore where the owners and insurers intervene to determine the way assistance is provided – often by seeking to negotiate commercial terms with contractors. The reasons may vary, but the fact remains that the use of the LOF is on the decline.

ISU is working with Lloyd's to support the LOF and to try to improve understanding of its benefits. ISU has also made clear the importance of the appropriate use of LOF – and other contracts. As President of the ISU, I am on record as saying that for all parties it is important to use the right contract in the right circumstances. ISU will encourage its members in this regard and will not tolerate bad practice or abuse of the LOF by its members. Equally, ISU expects other parties – the owners and their insurers – to be fair to salvors: *to contract in a transparent way that is in the best interests of all parties.*

It is not fair or right that insurers might try to exploit commercial pressures to encourage a salvor to use terms that are not best for the operation at hand nor in the long term best interests of the shipping industry. Because, put simply, if salvors are not able to make a decent return for their efforts and investments, then provision of professional salvage services will most certainly be eroded. And there should be no doubt that, in most cases, it is only the commercial salvors who stand between a casualty and a catastrophe.

***John Witte** is President of the International Salvage Union (ISU). Witte also serves as EVP and Senior Salvage Master at DONJON Marine and is also a past President of the American Salvage Association (ASA).*

Sailing into the Arctic's Future

By Randall Luthi

Luthi

Last month, a large cruise ship completed its inaugural cruise through the Northwest Passage. The historic journey brought nearly 1,700 passengers from Seward, Alaska, past the rugged wilderness and isolated villages of the Arctic, to the concrete jungle of New York City. Along the way, passengers and crew were treated to a stunning contrast of climates, geography and culture.

While understandable, concerns over passenger safety, wildlife disruptions and water pollution went unrealized during the historic cruise through the passage. A centuries-old navigational barrier has been successfully breached, presenting both challenges and opportunities for the natives of the Arctic. For them, the world has indeed become smaller, as receding ice now allows more face to face contact with outsiders from around the world. The challenge now is that these new opportunities are on terms determined by the Arctic natives, and that change in culture and technology come as a result of invitation rather than domination.

The same holds true for the energy industry, particularly offshore oil and natural gas. The Arctic has long held the potential for abundant energy development, which is supported by most Alaskan natives. However, like much of the Arctic, the Alaska OCS remains largely unexplored. Economic conditions and politics have literally put oil and natural gas exploration in the US Arctic on ice. As demonstrated by the recent cruise through the Northwest Passage, thawing ice is allowing for a new source of economic and social development through the tourism industry. Likewise, the economics of the energy industry are expected to improve, providing incentive for oil and natural gas explorers to prove the energy potential of the Arctic.

The question facing the energy industry is whether U.S. politics will allow for an energy thaw. It is important to point out that Arctic oil and natural gas exploration is not a nascent industry. In the Alaska Arctic, onshore development has occurred for decades, supplying a safe and consistent source of home-grown oil to consumers in the lower 48 states via the Trans-Alaska pipeline. Canada and Norway have been receiving oil and natural gas from offshore projects operating in the far north, and Russia has upped longstanding activity above the Arctic Circle by recently opening the Arctic gate marine terminal linking Russia's Arctic-sourced crude oil to European and Asian markets.

There is no reason why similar progress isn't possible within the U.S. Arctic. Energy demand will only increase in the coming decades, and by 2040 fossil fuels will still supply around 80 percent of our energy needs. An estimated 26 billion barrels of oil and 131 trillion cubic feet of natural gas lay offshore Alaska and could help meet this energy demand. Dozens of wells were safely drilled in the Beaufort and Chukchi Seas in the 1980s and 1990s using technology generations behind the modern technology used to safely drill a new well in the Chukchi Sea during the summer of 2015. Even though the hoped-for deposits were not discovered at that well, it is too early to rule out significant finds elsewhere in the area.

While the current low commodity price environment has indeed made things more challenging for an industry that is experiencing very tough economic times, what we do know is that offshore oil and gas developers take a long-term view and will often finance projects in the short-term knowing that projects planned today take many years to develop. While global energy market economics remain a challenge, U.S. policymakers can certainly take concrete steps to improve the regulatory environment and address the myriad, sometimes unnecessary, challenges to bringing home-grown Arctic energy to market.

One of the first steps in providing that environment is to guarantee lease sales in the Alaska Arctic, which will be no small feat. The Obama administration is finalizing the 2017 – 2022 offshore leasing plan and anti-fossil fuel activists, fresh off their success in the Atlantic, have made removing

The question facing the energy industry is whether U.S. politics will allow for an energy thaw. It is important to point out that Arctic oil and natural gas exploration is not a nascent industry. In the Alaska Arctic, onshore development has occurred for decades, supplying a safe and consistent source of home-grown oil to consumers in the lower 48 states via the Trans-Alaska pipeline.

the proposed Beaufort and Chukchi lease sales a top priority. It is vital for our nation's economic and energy security that the opportunity for sales in the Beaufort and Chukchi remain in the plan, and are without arbitrary and politically-expedient restrictions that render the sales meaningless.

The Arctic regulations promulgated by the U.S. government earlier this year largely serve to further restrict offshore exploration in the region. The regulations do not accurately reflect current industry practices or the ability to cap a well and capture oil and gas in the unlikely event of release during drilling. In fact, the regulations increase the cost of projects without increasing safety. Therefore oil prices have to be significantly better than they are today for companies to seriously plan for additional exploration activities in the Alaskan Arctic.

The current administration has also refused to endorse a revenue sharing plan for Alaska. The Gulf of Mexico states that participate in offshore oil and gas development (the only other place in the U.S. currently open for offshore leasing) have a revenue sharing program allowing both the Federal and state governments to receive royalties, bonus bids and rents paid by the oil and natural gas industry. The revenue is an added bonus to the increased economic growth that is a by-product of the oil and natural gas industry. For areas like Alaska's North Slope, where 99 % of the North Slope Borough's budget depends on oil and gas taxes, this would be a tremendous boost to help support local infrastructure, schools, community centers, and other basic services.

As the Arctic stands poised on the threshold of a new economic era, oil and natural gas exploration and development in the region requires joint cooperation between native communities, the state of Alaska, the federal government and industry. Bringing all these stakeholders together will not only ensure that there is safe development of our resources, but will ensure that local communities are not left behind in the new wave of Arctic policies from Washington, D.C.

Randall Luthi *is President of the National Ocean Industries Association (NOIA).*

NOIA
America's Offshore Energy Industry

U.S. Offshore Wind Comes to Life

MarineNews contributor Robert Kunkel asks: *Are We Ready to Support the Farms?*

By Robert Kunkel

On August 19, 2016, we watched as the fifth tower and associated nacelle was raised on the Deepwater Offshore Wind Farm approximately 3 miles offshore of Block Island, Rhode Island. This is the first Offshore Wind farm erected in the United States and, without a doubt, a huge step forward for this controversial project and alternative energy supply.

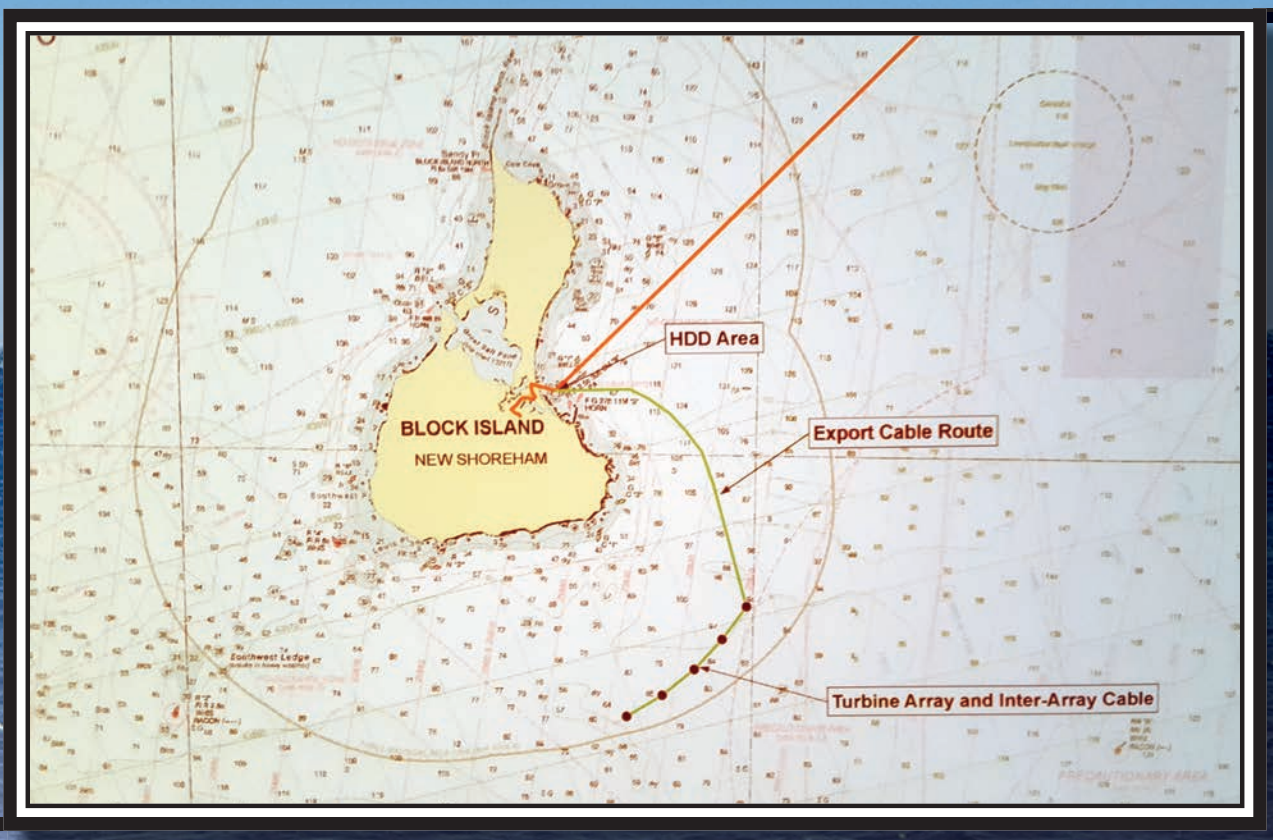
The Block Island Wind Farm has a total generating capacity of thirty megawatts and is projected to produce approximately 125,000 megawatt hours annually. Put another way, the project boasts enough power to support approximately 17,000 homes in this small island community. Beyond this, it is projected that as much as 90% of the generated power will be returned to the mainland grid.

Power in Motion

Commonplace off the coast of Europe, the installation is nevertheless impressive and is worth describing to North American readers who, until now, could only imagine what this sort of thing might entail. Five General Electric Haliade-150 six-megawatt offshore wind turbines are installed on turbine towers reaching 600 feet tall when the rotating blade is vertical. The blade length is 240 feet with a tip speed of 200 miles per hour when rotating. A rotor speed of 11.5 revolutions per minute is reached during operation in a minimum wind speed of 6.5 MPH. At 56 miles per hour, the nacelles are programmed to rotate away from the wind with blades feathered.

Each tower consists of three sections standing on a 1,500-ton foundation in 70 to 90 feet of water. A single cable, buried four to six feet deep in the seabed, interconnects the five towers. The transmission cable continues to the island substation ashore with a second transmission cable continuing to the Rhode Island mainland thirty miles away.

This power generation is proven technology and deployed around the globe at both land-based applications in the United States and Offshore in Europe and Asia. At each location, the attempt to harness patterned steady winds and transform them into clean, cost-effective electricity has been the target. This particular build is a test



application reaching completion after seven years of planning. The projected cost of the electricity generated for the island is far from competitive at this point in its development and the farm still faces a mixed opinion of support.

Despite early promises that the farm would be located far offshore its current resting place is clearly visible from the shores of Block Island and from Point Judith on the mainland. Recent complaints stem from the United States Coast Guard and Federal Aviation Administration navigation requirements lighting the wind farm at night. A series of flashing and blinking lights are now permanent fixtures in what was once a serene, coastal environment. Hence, onshore or offshore, oil or clean energy, the NIMBY or "not in my backyard" is still an issue.

The offshore lease has now been extended to eighteen (18) towers and turbines. And extension of the test project (now labeled Deepwater One) has the ability to grow to two hundred turbines in the near future. The power generation is projected to serve parts of New England and Long Island, New York reaching in excess of 1000 megawatts.

Offshore Wind: American Style

The offshore wind industry in the United States can create American jobs in the maritime industry. In this case, however, the Deepwater Wind towers were installed by the Fred Olsen Windcarrier's wind farm installation vessel Brave Tern that arrived in Rhode Island in late July. The 433-foot long jack-up vessel traveled to Rhode Island from Europe, with the five GE Renewable Energy nacelles for the Block Island Wind Farm aboard. This is one of the world's advanced installation vessels, with cranes capable of lifting 800 tons, and a self-propelled jack-up system allowing the ship to reach a height of roughly 480 during installation. That's not to say there wasn't U.S. involvement. There was.

Assisting with the installation, the liftboats Paul and Caitlyn, heavy-lift vessels from the U.S. Gulf of Mexico (operated by Montco Offshore) were capable of meeting U.S flag Jones Act requirements to shuttle turbine components from the Port of Providence to the Block Island construction site.

Make no mistake: the northern section of the U.S. East Coast through the mid-Atlantic coastal areas are prime wind locations. The first lease area is capable of creating of more than 1 Gigawatt of clean energy with the introduction of the first 200 turbines.

Separately, Atlantic Wind Transfers supports essential ongoing operations and maintenance activity, helping to guarantee the performance of the 5-turbine wind farm over the long term. For the lifetime of the Block Island project, Atlantic Wind Transfers will provide crew and equipment transfer services to meet these key logistical requirements. The 'Atlantic Pioneer', owned and operated by Atlantic Wind Transfers, the commercial wind support services arm of Rhode Island Fast Ferry, will embark on the first phase of a 20-year charter to support the construction and operation of the Block Island offshore wind farm.

The Atlantic Pioneer was built by Blount Boats in Rhode Island and is a 21 meter aluminum vessel that was designed by South Boats IOW, Cowes, Isle of Wight, U.K. South Boats IoW is a pioneer in designing and manufacturing crew transfer vessels and has built approximately 81 crew transfer vessels for the European offshore wind sector, servicing wind farms throughout Europe. It is the first of its kind to be built in the United States.

The Vessel is able to safely deliver 16 technicians in comfort, along with 3 crew and 12 tons of equipment directly to the base of a turbine or offshore platform. With a fuel capacity of 2100 US gallons, the Atlantic Pioneer has the capacity to operate for several days at a time between refueling, and can reach a maximum speed of 30 knots.

Real Potential: Will Domestic Stakeholders Respond?

Today, the offshore wind industry in Europe employs nearly 60,000 workers with 2,500 wind turbines operating off the coast of Europe today. On this side of the pond, however, key question(s) must be asked:

- ***Are we prepared to shift our energy concentration with its offshore support fleet and workboat labor force from the U.S Gulf to coastal New England?***
- ***Does current support vessel design meet the requirements of maintaining an offshore wind farm?***
- ***If so, how many vessels and trained individuals are required to provide that support?***

The Cape Wind offshore farm positioned off the coasts of Cape Cod, doomed by political pressure, was faced with EPA emission restrictions addressing the idling of crew and maintenance boats working the wind farm installation. The support requirement is slightly different than the delivery of stores, supplies and labor to offshore oil platforms in the U.S. Gulf. The towers are unmanned with the delivery of technicians to each tower requiring docking systems or boarding platforms not readily available in current U.S. workboat designs. The fact that labor must be efficiently delivered and retrieved each day leads to a

Blount's WFSV at a glance ...

Length Overall: 70.20' (21.4m)	Max Beam: 23.95' (7.3m)	Trim Control: (2) Humphree Interceptors
Length, DWL: 59.33' (18.08m)	Draft: 4.06' (1.24m)	Generator: Cummins Onan model 17 kW
Gearboxes: (2) ZF model 3050	Service Speed: 26 knots	Windows: Sea Glaze Marine Windows Ltd
Waterjets: (2) Hamilton HM571	Paint: International Paint	Cargo DWT: 12 Tons fwd & 3 Tons aft
Seats: Cabin / (12) Seat Design Co.	Passengers: up to 47	Engines: (2) MAN V12-1200CR [V-Nue]
Interior Lighting: Imtra (24v LED)	Builder: Blount Boats, Inc.	Cargo DWT: 12 Tons fwd & 3 Tons aft
Displacement (Lightship): 45 LT	Designer: South Boats IOW	Window Wipers: Exalto/Decca Straight line
Total Fuel Capacity: 2100 U.S. gal.	Fire Detection: Seafire	Air Conditioning: (3) Dometic Cruise Air

discussion of both boat speed and the reduction of emissions using hybrid or LNG propulsion technology while the boats drift in waiting.

The Deepwater ONE lease site is 256 square miles and the NIMBY problem continues to force the construction further offshore where Deepwater reports they will be "barely visible from shore." The size of the lease, its position offshore and the necessity to navigate between towers creates new design requirements. As a workboat industry, are we prepared to make that commitment, provide those designs to support alternative energy and create port infrastructures in a coastal area that has been developed for large tanker and containership terminal operation? Make no mistake: the northern section of the U.S. East Coast through the mid-Atlantic coastal areas are prime wind locations. The first lease area is capable of creating of more than 1 Gigawatt of clean energy with the introduction of the first 200 turbines.

The U.S. Gulf offshore industry continues to suffer from the current (low) price of crude oil. At the same time, the unanswered question remains: can clean wind energy rebuild our workforce and revitalize our shipyards? The Block Island wind farm is projected to begin generating electricity in the second quarter of 2017. Are we ready and we will be able to support the shift, should it occur, from South to North when the wind blows?

*Images courtesy of Robert Kunkel

Robert Kunkel, *President of Alternative Marine Technologies, previously served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the Maritime Administration and the USDOT from 2003 until 2008. A past Vice President of the Connecticut Maritime Association, he is a contributing writer for MarineNews. A graduate of the Massachusetts Maritime Academy, Kunkel sailed as a licensed engineer and continued his career in ship construction at NASSCO and Hyundai Heavy Industries, among others. He is a senior member of the Special Committee on Ship Operation with ABS and an elected member of the NCB.*

Hard at Work

As the oil industry awaits a much-needed rebound, Foss Maritime's robust presence in the Arctic region underscores its commitment to the region, the environment, and a business plan that looks ahead to the next chapter.

By Kathy A. Smith

Image above: Glacier Wind in Cook Inlet

**All images Courtesy Foss Maritime*

in the Arctic

Reports of the death of commercial Arctic activities have been greatly exaggerated. While Arctic energy projects have, by and large, been put on the back burner – like most things related to energy in other places – there are still many projects ongoing; and still others being planned. For example, and as ***MarineNews*** was headed for printer, a new coalition announced the launch of a 6-figure advertising campaign, calling on the Administration to include the Arctic in the next offshore leasing program. The coalition, which includes NOIA and other interested stakeholders, specifically addresses environmental groups who continue to insist that the current lack of active in the Arctic is justification for excluding the region from the plan. According to a coalition spokesperson, the advertising campaign is an effort to show that industry remains committed to the Arctic and in the most obvious terms possible, is putting its money where its mouth is.

In the meantime, workboats have found many reasons to be in the Arctic, despite the lull in action there. For example, Foss Maritime, veterans of Arctic ocean towing and short-sea shipping work, used several ice-class tugs, shallow draft tugs and deck barges to complete a complex and challenging two-year sealift operation to a remote area of the Alaskan North Slope, approximately 60 miles east of Prudhoe Bay. The work was done in support of a major oil exploration development project.

Workboats at Work: in the Arctic

During the first lift in the summer of 2013, Foss provided two barges, two ocean-going tugs, and two assist

Image above: Michele Foss in ice en route to the Point Thomson project site

tugs, including the 73-foot shallow draft tug Emmett Foss, making its first voyage after its construction at Foss Rainier Shipyard. The assets were used to transport two oil field tank modules from Anacortes, Washington to the project site on Alaska's North Slope.

For the second lift in the summer of 2015, four tugs, including the first of three Arctic Class tugs built at the Rainier yard, the Michele Foss, towed four barges carrying seven oil field modules, each weighing 2,685 short tons, 2,300 nautical miles from South Korea to the project site. These modules are used to process raw hydrocarbons into the requisite product streams. During the final shallow-water leg of transit, Foss pioneered a short-sea route through the Barrier Islands to get the job done.

"In 2015, the ice never really receded," explains Leiv Lea, Director, Project Management and Sales at Foss Maritime. "We used shallow draft tugs to bring the barges through that route, along with one of our tugs, and that allowed us to bring the barges in, without damage, even though the ice was out there (6.5' of draft was available at the delivery site). The shallow draft tugs passed back and forth on that route, and they did soundings that showed that the Michele Foss could be the lead tow tug through that passage. Once they got closer to Point Thomson, the shallow draft tugs took the barges into the dock."

Robust Platforms for Demanding Work

The Michele Foss and her sister vessel Denise Foss (which entered service this past summer and delivered further drilling equipment to Alaska's North Slope during the summer of 2016) are ABS D0 Arctic class tugs. The hulls are designed specifically for polar waters and are reinforced to maneuver in ice. The vessels comply with the requirements in the ABS Guide for Building and Classing Vessels Intended to Operate in Polar Waters, including ABS A1 standards, SOLAS and Green Passport.

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– Leiv Lea, Director, Project Management and Sales at Foss Maritime

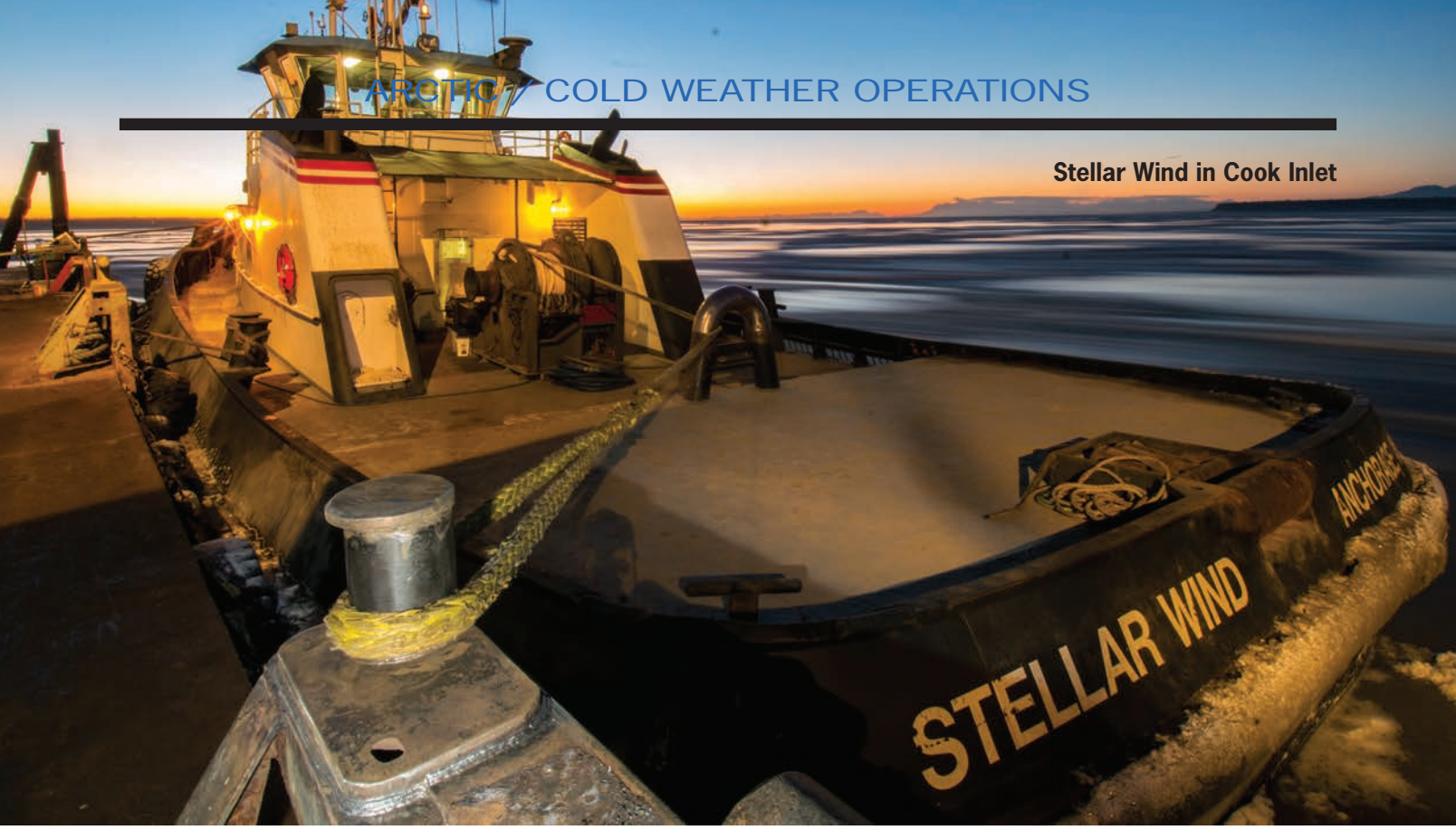
The Michele Foss has a bollard pull of 221,000 pounds and is equipped with a Caterpillar C280-8 main engine, a Nautican propulsion system and Reintjes reduction gears. Her tow winch was supplied by Markey Machinery. Notably, ballast tanks were deliberately not incorporated into the vessel's design to prevent the transportation of invasive species. Holding tanks were added for black and gray water to permit operations in no-discharge zones (such as parts of Alaska and California), and other green technologies include hydraulic oil systems compatible with biodegradable oil, energy efficient LED lighting, and High-energy absorption Schuyler fendering have arguably created the most environmentally-sound vessel for the pristine area it works in. The third vessel, Nicole Foss, is currently under construction at the Rainier yard and is expected to be in service in 2017.

Carefully Managing Ice

The entire 2015 transit from South Korea to Point Thomson took approximately 25 days steaming time at 7.5 knots; some variances occurred due to changing weather. The vessels stopped at Dutch Harbor to refuel before completing the voyage at Point Thomson. There are several areas where the team could wait for ice to clear, if needed. While the vessels can work in ice conditions, they are not ice breakers, explains Lea. "What we do is work around the ice," he says. "We have ice management plans. We do ice flights, where you have ice pilots that fly over the ice, and then they can determine the coverage and see if they see any routes developing. It's a really active procedure."

In addition to various Alaskan and Arctic projects, Foss has a year-round tug presence with its company Cook Inlet Tug and Barge (CITB). Shallow draft barges transport fuel around Western Alaska, and various towing jobs see the crews work in the Aleutian Chain as well as perform in-river work in the Yukon and the Kuskokwim regions.

In Cook Inlet, CITB provides harbor assist tugs that work as ice escort in the winter months from about November through April. "Typically we



Stellar Wind in Cook Inlet

"Typically we do ice escorts for tankers and fuel barges and any containerships that come into the upper Cook Inlet. Then we assist them into the dock. It's a pretty challenging environment because of the tidal difference."

– Ben Stevens, General Manager, CITB

do ice escorts for tankers and fuel barges and any containerships that come into the upper Cook Inlet," says Ben Stevens, General Manager, CITB. "Then we assist them into the dock. It's a pretty challenging environment because of the tidal difference."

CITB's main ASD ice-class tugs servicing this market are the 85-foot Stellar Wind and the 65-foot Glacier Wind. They also operate two conventional tugs, the shallow draft tug Captain Frank Moody, and a smaller vessel, the Junior, a 60-foot twin-screw tug that services Seward, Alaska. CITB also operates five petroleum barges of various sizes and three tugs in support of their sister company's fuel distribution business.

Fuel delivery is a necessity in rural Alaska, which keeps regular work coming in. That's especially important to any local business model because Alaska's tug and barge operators have encountered a fairly significant downturn consistent with the falling price of crude oil. CITB vessels deliver to remote regions of Western Alaska up through the Bering Strait. It's a challenging environment because most destinations have no port facility, so the barges are beached and hoses are deployed or hoses will be floated from where the barge is anchored.

In-river fuel deliveries are mainly for schools and power plants. "Once the ice pulls out in the spring, they're waiting for the fuel to come in after the winter, so the rush is on in the early spring to try to get the fuel into the communities as soon as we can," says Stevens. "And then you try to time it to get the fuel in there as late as you can in the season to top the tanks off before winter sets in."

Point Thomson

Kathy A. Smith is a Victoria, BC-based maritime writer who has penned over 100 published trade articles.

Unique Conditions demand Special Equipment and Personnel

Alaskan weather can be harsh and ever-changing, so being able to rely on people and assets is vitally important. Stevens says approximately 48 crew are rotated between vessels. "You have to have personnel that have a lot of qualifications and a lot of experience in the region and understand the dynamics that they could face because there are no support services up there," he says. "If you don't have the support service around, the small tug and barge unit has to be self-contained. It's a unique operating environment and it also takes a unique, qualified mariner to be able to successfully work those regions safely."

As the oil patch awaits better times, here and in the Gulf of Mexico, Foss and its business assets are already hard at work in the region. Investing in Arctic class equipment, it also looks like they are here to stay – in good time and bad.

Incentivizing Spill Response Innovation:

Researchers tackle the tough problems despite a lack of funding and official incentives to move forward. Progress, in particular for Arctic spill response equipment and techniques, is being made.

By Joseph Keefe

Credit: MPC

Even in the messy but now seemingly distant wake of such environmental disasters such as the Exxon Valdez grounding and the Deepwater Horizon accident, domestic oil spill response requirements still provide little or no incentive for responders in the U.S. to develop and deploy new equipment. Elsewhere, other countries (especially Norway) have better options for testing and approving systems using an intentional spill. Here at home, this approach has been recommended especially for the Arctic by many stakeholders, to no apparent avail.

Similarly, the BSEE issued a Request For Proposal (RFP) a few years ago but received none to investigate a 'research spill' and then perform one. That possibility, according to Kurt A. Hansen, a professional engineer at the U.S. Coast Guard Acquisition Directorate Research & Development Center in New London, CT, has nevertheless been a frequent topic of discussion for several years at the Interagency Coordinating Committee for Oil Pollution Research (ICCOPR).

That's not to say that industry stakeholders haven't tried to pitch in. They have. A very large project also directly addressing the Arctic response issue, funded to the tune of $25 million – money that Hansen says the federal government simply doesn't have) – has been launched by the Arctic Oil Spill Response Technology Joint Industry Program (JIP). In a nutshell, the project hopes to further build on existing research and improve the technologies and methodologies for Arctic oil spill response. With nine oil and gas companies participating, the stated goal of the JIP is to advance Arctic oil spill response strategies and equipment as well as to increase understanding of potential impacts of oil on the Arctic marine environment.

Last but certainly not least, Hansen says that the Research and Development Center (RDC), located in New London, CT, is the U.S. Coast Guard's sole facility performing research, development, and test and evaluation in support of the service's major missions. It has been in existence since 1972 having moved into its current home in New London in 2009. There are 18 military and 76 civilians at this location plus a staff of 7 (2 military) at Coast Guard Headquarters in Washington, DC. The RDC is responsible for evaluating the feasibility and affordability of mission execution solutions and providing operational and risk-management analysis at all stages of the acquisition process. Those evaluations sometimes involve spill response equipment.

One particular issue that troubles spill responders is that in 30% concentration, ice is not a significant impediment for most skimmers. Conversely, however, in 70% concentration, ice is a significant impediment, with most skimmers experiencing dramatically poorer efficiencies in the dense ice. In real practice, recovery rates for 70% ice conditions were found to be about half of the 30% runs and in some cases, that recovery rate dipped to less than 10 percent of 70% ice condition runs. Accordingly, RDC and its partners recently looked into the matter.

RDC & Partners in Action

Proving that there are people actively at work to improve domestic spill response capabilities and technology, the Coast Guard recently demonstrated some advances in cold weather oil response technology. Specifically, the RDC demonstrated conceptual systems that could improve recovery of oil in cold climates including New England, the Great Lakes and Alaska.

RDC, in cooperation with the Bureau of Safety and Environmental Enforcement (BSEE), evaluated an ice cage designed to keep ice pieces from impacting skimmer performance. The design was based on the results of BSEE's "Ice Month" testing at the National Oil Spill Response Research & Renewable Energy Test Facility (Ohmsett) in 2013. According to a report on the matter, "The results showed that most skimmers could not pick up oil in pack ice of over 70 percent coverage because pieces of ice interfered at the weir, brush or belt interface with the water that kept the oil from reaching the collection point. A system was tested at Ohmsett in March 2014 and for the Coast Guard's Helix skimmer it appears to improve the collection capability."

"Ice Management System designed by MPC is in patent pending status. The company is considering the potential to offer a version for commercial users based on its evaluation of market opportunities."

– William E. (Bill) Hazel III,
Director of Marine Services at Michigan-based
Marine Pollution Control (MPC)

In this case, RDC collaborated with Marine Pollution Control (MPC) of Detroit to develop an ice cage system which permits oil to flow into the skimmer and keeps

"Contracts were awarded to Marine Pollution Control (MPC) for the ice cage and Elastec American Marine (Winner of the Wendy Schmidt Oil Spill X-Prize) for the temporary storage device. Both of these contractors set up and operated the equipment during the evaluation. The Coast Guard provided the ship, CGC JUNIPER, and lifting capability using the CGC JUNIPER's crane."

– Kurt A. Hansen, U.S. Coast Guard Acquisition Directorate Research & Development Center in New London, CT

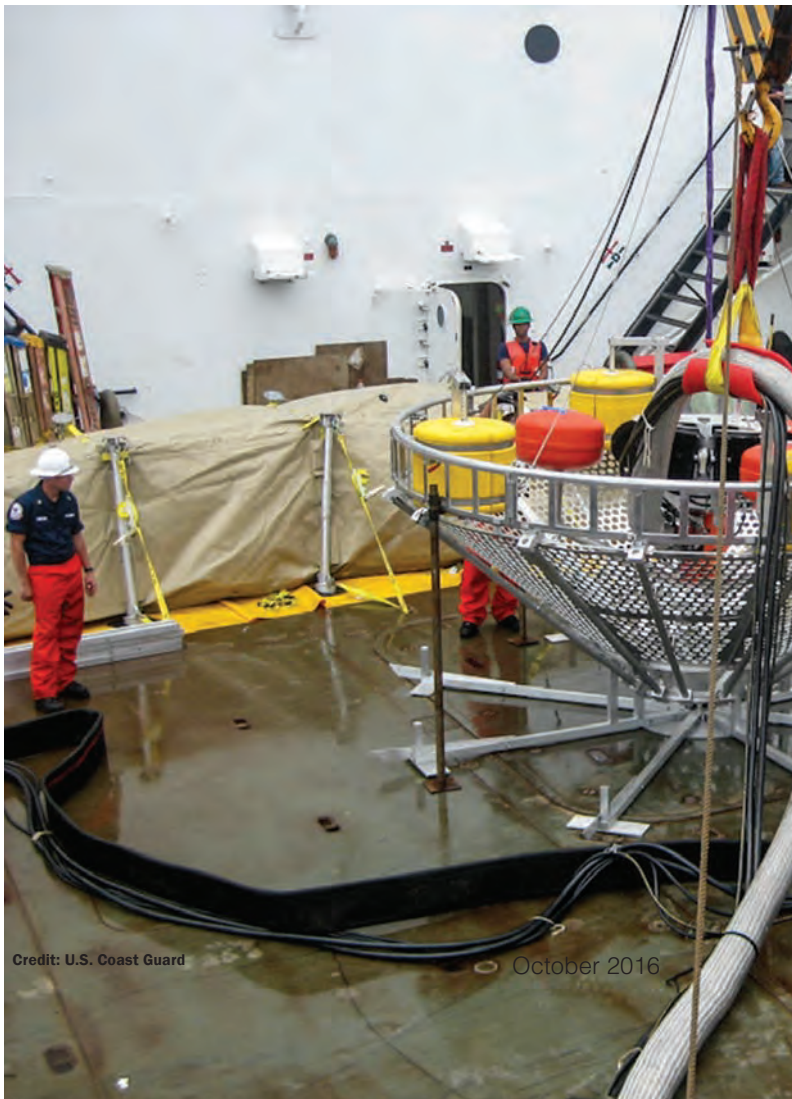
ice away from that critical area near the skimmer opening. The system was tested in ice in 2015 and the data showed an increase in recovery rates (from about 4 gallons per minute (GPM) to about 18 pgm at ice coverages of 50-63 %) for the Coast Guard's existing Helix skimmer.

Kurt Hansen explains further, "RDC had a contract with Science Applications International Corporation (SAIC), one of our delivery order contractors, to assess the current decontamination procedures and provide recommendations that RDC could evaluate during the Newport test. Contracts were awarded to Marine Pollution Control (MPC) for the ice cage and Elastec American Marine (Winner of the Wendy Schmidt Oil Spill X-Prize) for the temporary storage device. Both of these contractors set up and operated the equipment during the evaluation. The Coast Guard provided the ship, CGC JUNIPER, and lifting capability using the CGC JUNIPER's crane."

Crewmembers from Coast Guard Cutter Juniper conducted a test of a prototype ice cage, which is designed to keep ice away from the skimmer but permit oil to still be recovered. The system is designed for use in broken ice when oil pools between pieces of ice. The ship would maneuver and dip the ice cage/skimmer into each pool successively, picking up and moving carefully, trying not to push the ice so that the oil does not go over or under it.

Tested with two existing devices – a brush skimmer and a drum skimmer – the device could possibly be made available for commercial response cooperatives to purchase, but, says Hansen, "This is still being determined." Indeed, the prototype system that still needs refinement. Also according to Hansen, RDC is gathering recommendations from the evaluation to make setup and use easier and better; which will be written into a report available later this year.

The Coast Guard owns the equipment; which will be temporarily stored in a warehouse in Newport News, VA where Coast Guard personnel are available to handle storage and maintenance issues. Policy and decision makers at the CG Headquarters level will be provided the report and make decisions about future use. Separately, William E.



Credit: U.S. Coast Guard

(Bill) Hazel III, Director of Marine Services at Michigan-based Marine Pollution Control (MPC), told ***MarineNews*** last month that "Ice Management System designed by MPC is in patent pending status. The company is considering the potential to offer a version for commercial users based on its evaluation of market opportunities." MPC, according to Hazel, is a spill response provider, but also has robust manufacturing capabilities.

Attention was given to determining how and what the minimum size of workboat or 'vessel of opportunity' could handle the equipment, if deployed. Together, the ice cage, skimmer, and hoses weigh about 2,000 pounds, so a crane would be needed with a reasonable lift distance of 30-40 feet at that weight. The amount of deck space needed would depend upon what is being used for temporary storage. The largest temporary storage tank for this demonstration was 6 feet wide by 30 feet long with straps reaching 3-5 feet out for supports.

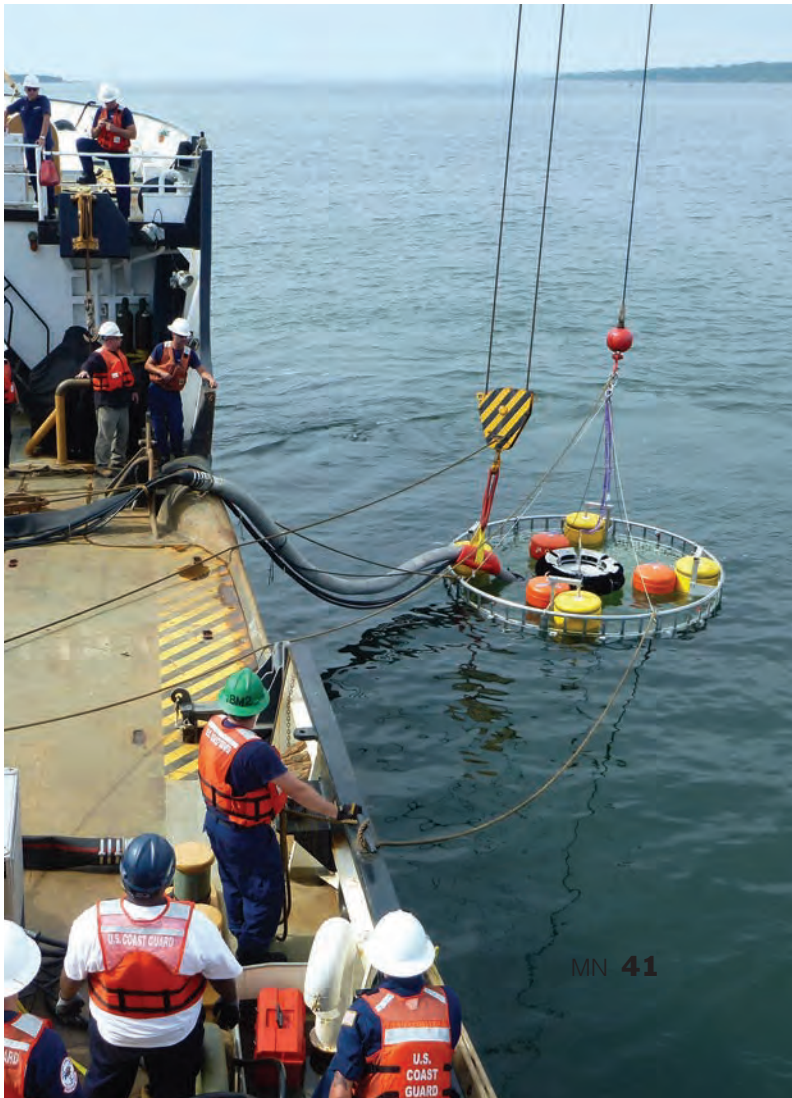
As a general statement, the ice cage has been found to improve recovery efficiency for skimmers as long as the operator has the time, patience and the skill to both move the cage around and effectively manage the ice.

Encouraging Innovation

Fueled by the kind of success achieved at RDC, both industry and the federal government continue to promote avenues for innovation. BSEE, for example, has also developed software that could possibly be used to foster a more systems-based approach, which would in theory result in a better selection of equipment and encourage innovation. At the same time, BSEE has also sponsored multiple projects to address simulants and how to get innovation into the field.

And, not to be left out of the process, the Oil Spill Recovery Institute (OSRI) of Alaska, funded by the Oil Spill Liability Trust fund (OSLTF) set up after the Exxon Valdez spill, recently sponsored a workshop about how to introduce innovation. Issues range from funding to the lack of incentives for commercial stakeholders to move forward.

As the Arctic becomes more and more accessible to commercial traffic – in more places and in volumes that grow – the need for viable spill response capabilities, equipment and techniques is only going to become more critical. Despite impediments to that effort, both government and commercial stakeholders are making progress. Clearly, we need more.



Changing Spill Risk in a Changing Arctic Landscape

Industry analyst and environmental consultant Dagmar Schmidt Etkin, PhD, takes a hard look at a rapidly shifting operational landscape in the Arctic. Always an honest broker of information, Etkin tells it like it is.

By Dagmar Schmidt Etkin, PhD

Etkin

Oil spill risk is present anywhere that oil is present in reservoirs, or is transported, consumed, stored, and handled in some way. The Arctic is no exception. Not only are there oil reserves in the Arctic, some of which are being or will soon be considered for exploration and production, there is also oil being transported as cargo or as fuel to Arctic communities. And, with the opening of the Northwest Passage and other Arctic shipping routes to year-round traffic, there could be increasing numbers of tankers, as well as freight vessels traveling through these areas carrying oil as cargo or fuel.

Risk (& Rewards)

Oil spills in the Arctic present a threat to unique sensitive ecological resources in the region. In addition, there is a significant threat to large numbers of indigenous populations that inhabit the region and rely largely on fishing and hunting for both subsistence and cultural importance.

At the same time, there are significant changes in the Arctic brought on by climate change. While this has allowed vessel transport, it is also creating concerns with respect to ecological changes, as well as our understanding of the Arctic region's environmental issues. This changing Arctic landscape is presenting a challenge to risk assessment processes.

The Arctic is estimated to contain about 90 billion barrels of undiscovered oil, 17 trillion cubic feet of undiscovered gas, and 44 billion barrels of natural gas liquids, making up, respectively, 16%, 30% and 26% of the world's individual undiscovered hydrocarbon resources. There have been and currently are oil exploration and production activities in several locations, including the Alaskan North Slope. There are also proposed projects in the US and Canadian Arctic including in the Beaufort Sea, off Labrador, as well as off Greenland.

Various risk assessment studies are being conducted by government entities, environmental organizations, and oil companies to determine potential environmental impacts from hypothetical discharges. The oil behavior and spread under large and worst-case discharge scenarios are being evaluated. The remoteness of these locations, as well as weather conditions, presents unique challenges for spill responders, which is the focus of some government studies, including one recently conducted for the US Bureau of Safety and Environmental Enforcement (BSEE) due to be

Risk in the Arctic: by the Numbers …

90 billion – the volume in barrels of undiscovered oil in the Arctic; 16% of the world's reserves
17 trillion – cubic feet of undiscovered gas in the Arctic; 30% of the world's reserves
44 billion – barrels of natural gas liquids in the Arctic; 26% of the world's undiscovered hydrocarbons
1,100 – number of sunken tankers and larger vessels (> 300 GT) in Arctic, sub-Arctic waters
50 – years in age of 75% of those wrecks
32 million – maximum volume in barrels of oil contained by wrecks in Arctic & sub-Arctic waters
120 – equivalent number of Exxon Valdez spills-worth of oil contained in the Arctic wrecks
1,961 – number of vessels passing through Unimak Pass in 1012
4,615 – number of transits those vessels made through those same waters
350,000 – volume in gallons of heavy fuel and marine diesel spilled by the Selendang Ayu
86 – number of miles of beach impacted by the Selendang Ayu spill
13.6 – millions of dollars annually needed to create an Arctic Optimal Response System in the Arctic
13,000 – cost per vessel in dollars of that same Optimal Response System

made public in November 2016.

But these studies do not necessarily indicate that there will be new exploration and production activities in the near future. Given changes in oil markets, the certainty of future oil exploration and production projects is in question. In late 2015, for example, Shell Oil pulled out of its planned oil exploration activities in the US Arctic.

Every Day Risk & Preparing for it

Even without offshore oil activities, there is already a potential spill threat from existing vessel traffic supplying Arctic communities, as well as commercial ventures, such as mining activities in Labrador. These vessels bring in fuel and supplies, as well as transport mined ores out of the region to other ports.

Vessels transiting to and from communities or commercial operations are not the only vessels passing through Arctic waters. There are also a good number of vessels in innocent passage that make use of newly-opened waters that are now clear of ice for longer periods of time or are opened by ice-cutters or vessels equipped with ice-breaking capabilities.

A five-year risk study examined the risk that these vessels posed to the Alaskan Aleutian Islands, for the purposes of developing an appropriate emergency response system. The impetus for this study was the December 2004 grounding of the bulk carrier Selendang Ayu off Unalaska Island. The Selendang Ayu spilled 350,000 gallons of heavy fuel oil and marine diesel, as well as 132 million pounds of soybeans, impacting 86 miles of beach and causing the deaths of thousands of birds and other wildlife. The spill necessitated the temporary closing of commercial and subsistence fishing grounds, and caused significant response challenges.

The Aleutian Islands Risk Assessment Study found that in 2012 vessel traffic data indicated that 1,961 vessels had passed through Unimak Pass in 4,615 transits, of which 45% were engaged in innocent passage. Though they passed through US territorial waters, they were not subject to US oil spill prevention and response regulations, however. A response gap analysis indicated certain spill response options, such as on-water mechanical recovery and aerial dispersant application, would be prevented nearly 75% of the time due to weather issues. The remoteness of the area and lack of shoreside infrastructure would also affect the potential effectiveness of spill response measures.

The study recommended a number of measures to prevent spills, including the development of an Optimal Response System with: vessel routing measures and areas to be avoided; stationing of emergency towing vessels; and enhanced salvage capability. The estimated annual costs of the system were $13.6 million per year – or about $13,000 per vessel, though was greatly exceeded by the estimated costs of a major oil spill.

In addition to potential new oil pollution threats, there is also a legacy of threats in the form of potentially-polluting shipwrecks. The RULET project conducted for NOAA identified only two wrecks of concern in Alaskan waters, but there are believed to be an estimated 1,100 sunken tankers and larger vessels (over 300 GT) in Arctic and sub-Arctic waters around the globe. These sunken vessels may contain as much as four to 32 million barrels of oil; or 15 to 120 Exxon Valdez spills-worth of oil on those vessels. Many of them are thought to contain other hazardous substances, chemicals, or munitions. About 42 percent of these wrecks are World War II-related; about three-quarters of the wrecks have been there for over 50 years. These wrecks may present a spill risk, and that risk is likely to increase with time.

The risk of oil and chemical spills in Arctic and sub-Arctic waters in this evolving landscape present new challenges to the maritime community and others that may be involved in transport and other activities in the region. There are opportunities for cooperation amongst the nations that are located in or have borders in the Arctic or whose vessels transit these waters. The Arctic Council, and its eight member states – U.S., Canada, Denmark, Finland, Iceland, Norway, Russia, and Sweden – have made some strides in this area by signing the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in 2013. There are also opportunities for industry organizations to make meaningful contributions in this area. The World Ocean Council has held several summit meetings on this topic.

Dagmar Schmidt Etkin *has 30 years of experience in environmental analysis — 14 years investigating issues in population biology and ecological systems, and 16 years specializing in the analysis of oil spills. She has earned a Ph.D. from Harvard University, Organismic & Evolutionary Biology (ecology, statistics, population modeling), 1982, a Masters degree from Harvard University (Biology), and a B.A. from the University of Rochester in 1977.*
Reach her at ***etkin@environmental-research.com***

ENVIRONMENTAL RESEARCH CONSULTING

Electric Motors for Marine Applications:

Empire Magnetics President Richard Halstead discusses the critical considerations necessary for engines operating in Arctic waters.

By Richard Halstead

Halstead

A large number of vessels sail in more than one ocean, from warmer seas to arctic waters, so motors for marine applications must be versatile enough to operate in a variety of conditions. While the greater majority of my experience involves building motors for use in fin controls on mini submarines, robot arms on deep sea remotely operated vehicles (ROVs), deep ocean oil well tools, under ice scanners and scientific research support equipment, the same principles nevertheless apply to motors for use on any kind of workboat. For Arctic operators, there are myriad variables to consider, address and ultimately monitor.

Credit: Empire Magnetics

A waterproof motor with stainless steel exterior

Considerations for General Marine Applications

The torque, speed and power requirements to accomplish a task are exponentially higher for motors that operate under water. Undersea movement is much slower than in air due to the power required to push through the water (viscous drag). Often, the power limits are not on the motor itself, but instead on the power supplies because batteries have limited capacity, especially at low temperatures. Battery life is a critical concern for ROVs, so it's common to see performance specifications change as the math gets done to calculate the power needed to make a specific move.

Cables can supply power to undersea motors, but power loss between the drive electronics and the motor can be an issue. For example, a 2,500 foot cable is really a 5,000 foot cable on a roundtrip. A typical AWG 14 copper wire would present about 12.5 ohms of resistance. At 5 amps, and using ohm's law, a 63-volt loss in the cable would be realized before it gets to the motor.

Control of the system is another issue. While it's desirable to have control topside, feedback delay and noise on the line are reasons to put the drive in proximity to the motor. A reasonable compromise is to place the drive electronics in a dry tank located near the motor; this way only power and high-level communications come down the cable. Fiber optics can be used to solve the noise and speed issue for more reliable communications.

Every marine application must address the effects of corrosion. For long-term submersion, the material of choice is 316 stainless steel. It is best if the steel is 'passivated' after machine work is done. Passivation maximizes the corrosion resistance of stainless steel by removing surface iron with an acid solution. While a number of boats use anodized aluminum to resist the effects of corrosion, when it comes to mechanical assemblies that are bolted together there are problems with the anodize coatings. To be spe-

cific, the coating is a hard anodize. This aluminum oxide coating is difficult to get into small holes, and the thickness of the ceramic layer is such that putting anodize over threads in a hole will typically make it impossible to install the bolts. In addition, the actions of tightening the bolts will crack the protective layer exposing the aluminum to seawater corrosion.

The corrosive effect of sea water is accelerated when there is a mixture of metals. Dissimilar metals in contact with seawater can form a kind of battery, resulting in rapid metal erosion known at galvanic corrosion. When necessary, such equipment can be protected by intentionally adding sacrificial metal blocks such as zinc. If one checks the anodic index of metals, it is possible to appraise the likelihood of such corrosion. For example, brass has an index of .4 while galvanized steel has an index of 1.2 – the 0.8 difference represents the voltage that will be generated between the two metals if they are in contact while submerged in an electrolyte such as sea water. In this example, the combination of brass and galvanized steel is almost certain to result in rapid erosion of one of the metals.

While corrosion to the exterior of a motor is to be mitigated, internal to the motor it is best to be avoided. The copper wire that is typically used for motor winding corrodes quickly, but more immediate is the fact that salt water is conductive, so it will short out the electrical circuit. Sure, there are coatings, varnishes, and potting materials that are protective, however for long term submersion nearly all the organic insulation materials will absorb water. Hence, it is far better to avoid the problem by excluding the water from the assembly in the first place using oil filled and pressure equalized assemblies.

Unique Issues for Arctic Conditions

After taking all other variables into consideration, motors that perform in extreme cold do have unique issues. The viscosity of oil and grease increases at low temperatures. Since drag increases with viscosity or grease stiffness, it takes more power from the motors to overcome the stiff grease in the bearings or the viscous drag of an oil filled assembly.

A designer must consider the coefficient of thermal expansion (CTE) more carefully when making equipment for low temperatures. As materials get cold they shrink at different rates. If the CTE is not considered in the design, failures can result. A simple example is a bronze bushing being used as a bearing around a steel shaft. As the temperature drops, the bronze shrinks faster than the steel so the bushing clamps on to the shaft and prevents it from moving.

Another issue facing Arctic operators is that steel and ferric metals become brittle at low temperatures, so gears and other mechanical assemblies subject to shock and high loads have to be significantly oversized to avoid breaking when temperatures plummet to -55 C.

Similarly, elastomeric materials become much less flexible, so dynamic frictional seals, typically used for shaft seals on motors are less reliable. Due to lower chemical activity at lower temperatures, battery output is degraded, and this can happen just as the demand for power is increasing.

The end user or design engineer has to come to grips with general performance degradation at low temperatures. The choice is to specify performance when the system is cold – this significantly reduces performance at normal temperatures – or to provide performance versus temperature ranges.

Getting Started

Building an oil-filled, pressure compensated, waterproof motor is a complex task with several factors to consider. To do it right, one first needs to know the amount of oil in the assembly, the expected temperature range, the temperature at which the motor is to be filled, the final position of the cylinder after filling, and the total volume of displacement of the cylinder over its travel.

If the unit is completely filled with oil at room temperature, when the motor runs and the oil warms up, the oil will expand. If there is no pressure compensator (in this case, a piston in a cylinder), the hydraulic pressure will blow the seals out of the assembly.

On the other hand if the motor assembly is under filled at room temperature, when the unit gets cold, as in the Arctic Ocean, the piston will hit bottom, the oil will continue to shrink and the sea water under pressure will get inside the unit.

As industry and governments alike awaken to the new reality of expanding Arctic operations, many variables – unique conditions for properly built electric motors, for example – will come into play. In this case, 'sweating the small stuff' will pay off for stakeholders who hope to successes in a rapidly expanding, but still unfamiliar ocean environment.

Richard Halstead *has nearly four decades of experience in the automation industry. He is the President and Chairman of Empire Magnetics. He is the named inventor on several active patents, with more in process. He has also authored a number of technical articles.*

Overcoming the Propeller Supply Bottleneck

Hydrocomp's ProCad facilitates in-house Process Control of Propeller Design and Manufacture.

By Don MacPherson and Adam Kaplan

Maritime Tactical Systems Inc. (MARTAC) is a Florida-based company building next-generation unmanned vessels for military applications. In preparation for the "Rim of the Pacific" (RIMPAC) military exercises in Pearl Harbor this last July, MARTAC needed a new propeller design for their MANTAS series high-speed vessels. Unfortunately, their current supplier was not meeting delivery schedules for the high-quality surface-piercing propellers that they need, so MARTAC made the decision to design and build propellers themselves. As part of this new in-house process control for propeller design and manufacture, MARTAC teamed with HydroComp for acquisition of the PropCad propeller design software, as well as design services for an initial prototype.

ADOPTING IN-HOUSE MANAGEMENT OF PROPELLER DESIGN AND MANUFACTURE

For many companies, propeller supply can be a major project bottleneck, as lead times can be long and delivered propellers sometimes needing additional rework to meet QA requirements. Further, large propellers require foundry and machining equipment that make own-control of manufacture unrealistic. MARTAC's MANTAS vehicles are small (less than 3 meters length), so the scale of the propellers made it feasible to manage the manufacture in-house.

A multiple product series of propellers was to be required by MARTAC, so they decided to conduct the design in-house and adopted the PropCad software for the geometric modeling of the designs. A parent design provided by HydroComp would be used as a design "template" for later variants developed within PropCad. With less than 30 days to RIMPAC, the deadline for creating an initial design, manufacturing the necessary sets of propellers, testing their performance, and selecting a final design for RIMPAC was extremely tight.

WHEN RAPID REALLY MEANS RAPID

Within six days from the start of discussions with HydroComp, MARTAC acquired PropCad, received the design geometry for the prototype propeller, and sent the 3D CAD files to be manufactured by a national 3-axis production company. The propellers were completed and shipped three days later, for testing that weekend. A slight revision was requested for updates to the drive line connections, and a second design iteration was completed and sent out for machining four days later. The final propellers arrived 19 days from the start of discussions between HydroComp and MARTAC, with plenty of time to spare before RIMPAC.

How was MARTAC able to overcome the propeller supply bottleneck and meet such an impossibly tight timetable? By leveraging the facility of the HydroComp PropCad software to own the design-to-manufacture process with the added value of the propeller design expertise of HydroComp staff.

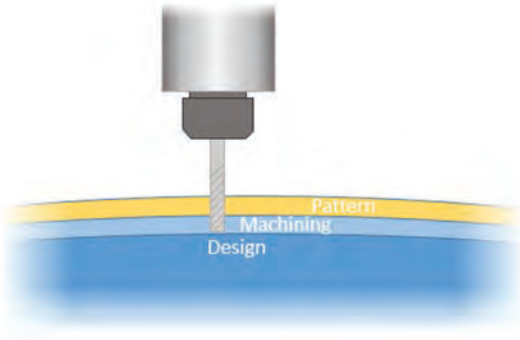
HYDROCOMP PROPCAD SOFTWARE

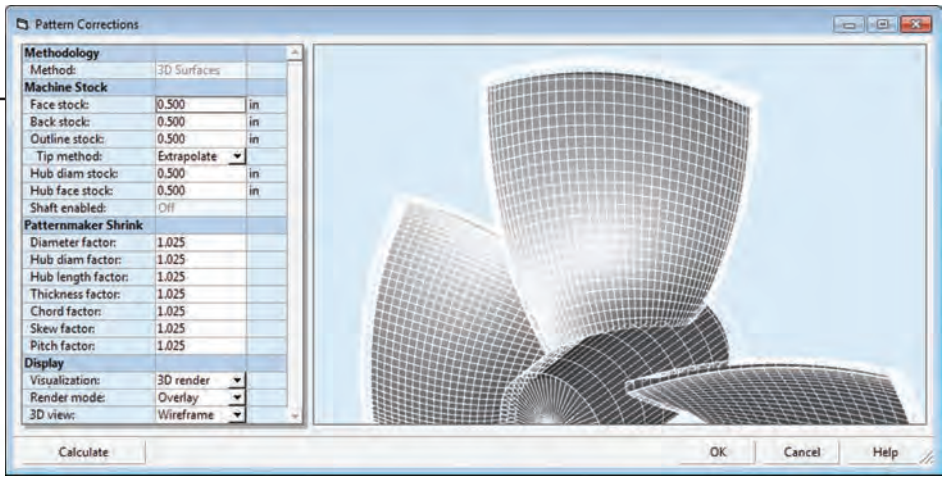
HydroComp PropCad is industry-standard software for developing marine propeller designs, 3D models, 2D drawings, and various inspection reports. Used by over 160 professionals in more than 40 countries, PropCad has made possible the in-house management of propeller design and manufacture – whether that be by a propeller builder with their own foundry or a company like MARTAC using an outsourced production company.

Standard CAD tools are poorly suited to develop the special non-orthographic shapes of propellers that are oriented along a helical surface. Prismatic shapes and planar sketches are simply inadequate, as well as frustrating and costly. PropCad is a dedicated propeller design environment that makes developing the blade sets fast, easy, and cost-effective. It is a parametric tool that develops the propeller surfaces from the design objectives you specify – there is no manual manipulation of the CAD surfaces required. This means that users do not need extensive CAD experience to quickly develop accurate and well-behaved propeller CAD models with its integrated parametric modeling. PropCad's various export options insure that users can develop virtually any 3D "design-for-manufacture" propeller geometries that are required.

MANUFACTURING AND INSPECTION SUPPORT

PropCad is not only used for design geometry, but can be used to compensate a design for different manufacturing





processes, such as plastic injection molding, lost-wax casting, green-sand casting, or CNC machining. A new Pattern Corrections utility in the Premium Edition of PropCad allows users to specify machine stock and shrinkage factors to create machining models, casting patterns, and mold geometries. Eliminating direct manual manipulation of the propeller design surfaces, the utility allows these corrections to be specified as parameters. The changes are applied mathematically and directly to the propeller parameters, with calculation and visualization of corrected sections, blade parameters, and radial distributions. Consequently, adjustments to a pattern can be made by simply adjusting the parameters instead of directly manipulating the surfaces.

PropCad can export to a variety of CAD and CAM packages, including Unigraphics NX, Rhino, Solidworks, Pro/Engineer, Creo, SurfCam, MasterCam, DELCAM Powershape, and others. Additionally, PropCad exports to a variety of universal formats, such as IGES and point clouds. This flexibility in CAD/CAM output enables users to migrate propeller and pattern designs into a variety of packages to add details and produce CNC tool paths.

After the propeller has been produced, PropCad includes many different methods for quality assurance. These include detailed inspection maps and local pitch reports. For high value projects, data points from the surface can be measured and input into the Scan Converter module. The 3D geometry from the measured propeller are derived and compared to the design values in order to verify the accuracy of the manufacturing process.

RIMPAC SUCCESS

While at RIMPAC/Trident Warrior 16, MARTAC operated and demonstrated the MANTAS with their new PropCad-designed propellers. The operations were wildly successful, and many groups including the Navy Mid Pacific Afloat Training Group (ATG), Coastal Riverine Squadron (CRS-3), several U.S. Congressman and their staff, high ranking military personnel, Defense Ministers of Allied Countries, and even the Undersecretary of the Navy were provided initial operator training and were able to successfully operate the MANTAS craft both from shore, and in the case of the ATG and CRS-3 personnel, from onboard their Rigid Hull Inflatable Boats (RHIBs) and Riverine Command Boats (RCBs). Through the acquisition and application of the HydroComp PropCad software, MARTAC was able to – in a very short time – take complete control of the propeller design process, thereby resulting in a significant increase in the number of potential manufacturers for their designs, and a dramatic reduction in the lead time for obtaining propellers for their MANTAS series vessels.

MARTAC's Chief Technology Officer Jack Rowley perhaps said it best, explaining, "PropCad was a key component in the ultimate success of the MANTAS craft operations in the RIMPAC/Trident Warrior naval exercises. As we further expand the design characteristics of the craft, we expect that PropCad will continue to be a highly useful tool for improving our craft performance hydrodynamics."

Donald MacPherson *is co-founder and Technical Director of HydroComp, Inc., a consultancy established in 1984, specializing in applied hydrodynamics with particular emphasis on the numerical prediction of vessel and propulsor performance. MacPherson is a graduate of the Webb Institute of Naval Architecture, a Fellow of the Society of Naval Architects and Marine Engineers, a member of the SNAME H-8 Propulsion Hydrodynamics Panel, and a frequent author and speaker on ship resistance and propulsion, sea trial and bollard pull analysis, and propulsor design.*

Adam Kaplan *is a mechanical engineering graduate of the University of New Hampshire and project engineering with HydroComp. With an extensive background in CAD/CAM and manufacturing, he currently leads development of new versions of PropExpert and PropCad software at HydroComp. Adam is an active member of the Society of Naval Architects and Marine Engineers (SNAME) and the National Marine Propeller Association (NMPA).*

BoomVane – A Powerful Boom Deployment System

The BoomVane is one of the most useful and interesting tools available to oil spill responders for shoreline and single vessel boom deployment. Maintaining an effective oil containment boom configuration with two vessels is difficult to coordinate. The Elastec BoomVane solves that problem. BoomVane can also tow heavier booms greater distances than an outrigger arm resulting in wider sweep swaths.

Illinois-based Elastec is the manufacturer and owner of the proprietary BoomVane technology. Elastec offers four BoomVane sizes to accommodate various water depths. They are manufactured in the Company's ISO 9001:2008 facility in Carmi, Illinois, along with a complete line of oil skimmers, work boats, containment boom, fire boom, vacuum systems, portable incinerators and other environmental equipment. These include:

- *0.5m BoomVane for shallow waters (less than 1m / 3 ft)*
- *1.0m BoomVane for shore-based and vessel sweep applications in rivers and coastal waters*
- *1.5m BoomVane to handle larger and longer lengths of oil containment boom*
- *2.5m BoomVane for coastal and offshore single vessel advancing mode operations*

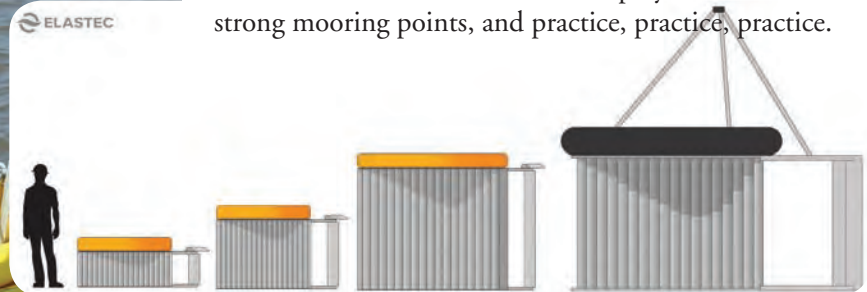
Powerful Performance

An evaluation of the BoomVane and a similar device in the late 1990s took place on the Illinois River near St. Louis, Missouri. The BoomVane was the clear winner at pulling and holding a boom from the shore into the current. It was so powerful, the mooring line pulled a 3-foot diameter boulder into the river. Even a pickup truck has been pulled into the water by the powerful BoomVane. Finding an appropriate mooring base is imperative as the towing force is even more powerful in strong currents.

When using the BoomVane from the shore, the deflection mode is relatively easy to deploy. The force of a 2 knot current on 200 ft of boom with a 12-inch skirt is approximately 4,400 pounds — 2 tons of water. The BoomVane and its boom system have a geometry that share the load of the boom with the mooring line, but there are still high forces that can place over 2,000 pounds on the mooring line. The mooring line and hardware that is included in the BoomVane is rated well above these forces and should not be replaced by anything inferior.

As with any oil spill equipment, to operate the BoomVane successfully and safely, training and practice are vital. Although simple in design and operation, safe deployment of the BoomVane requires training and adherence to the guidelines along with an abundance of common sense and practice. The Elastec BoomVane manual appendix contains diagrams, safety information and data tables for proper distances, lengths and forces. The maximum current speed should also be determined to ensure the mooring point is strong enough. An alternative to fixed anchor points may be stakes in plates or Elastec's Terra Twist anchoring system.

With the proper training, the Elastec BoomVane simplifies the challenges of booming, especially in a fast river. The critical factors for successful BoomVane deployment are having the equipment in good, ready condition, personnel trained to assemble and deploy, identification of strong mooring points, and practice, practice, practice.



TUCO MARINE'S ARCTIC WORKBOAT DAUGHTER CRAFT

Danish producer Tuco Marine has introduced an all new Arctic Workboat Daughter Craft. Developed in response to international requests and specifications, the unique craft has been in every detail optimized for Arctic and/or cold weather operations. In a nutshell, the Tuco Marine ProZero series of Daughter Crafts, Workboats and FRC´s are designed to meet the needs of the huge number of Arctic Patrol Vessels, Icebreakers and Polar Research Vessels that are currently under development and construction. For this sector, says Tuco Managing Director Jonas Pedersen, the Tuco Workboat Daughter Craft turn out to be a great match. Tuco worked closely with Arctic operators and ensured that end users were closely involved in the workboat's design and layout.

For example, the ProZero´s hull, in the arctic edition, features special hull appendages, to optimize for ice sailing, and the ProZero hull provides a stable ride in rough seas, where most vessels must give up. Arctic missions in rough seas are mainly limited by the human factor of shock mitigation and climate impacts. Hence, ProZero workboats incorporate the Tuco design team's shock mitigation strategy, as well as an effort to further minimize the effects of the cold climate to humans, boat and equipment.

ProZero workboats can be rapidly reconfigured to meet different roles and requirements, which can include SAR variants, fire support variants and command platform variants. A module-based business model allows for quick delivery time even when the boats is customized during the design phase.

This particular vessel features a full composite carbon fiber hull with PVC core, vinylester resin system. The hull shell features additional reinforcements for operation in ice areas. This daughter craft is developed to deploy different equipment and perform a wide range of tasks in its large aft deck. The design of the ProZero cabin also ensures a plentiful daylight, improving personal comfort. By producing a vessel that is significantly lighter than market average, lower fuel consumption is realized and lighter lifting equipment is required on the mother vessel. The sandwich construction avoids the use of internal stiffeners, increasing the usable internal space and offers a natural insulation capability, improving the comfort in the cabin and manned compartments. An on deck lifting frame is ready for single point lifting hook and the Deck and cabin are designed for self-bailing. Beyond this, a rounded aft platform is fitted to enable reversing in ice areas and a 'defreeze' system for windows with hot air blowers is also fitted. All in all, Tuco has (arguably) thought of everything. That's because when you are operating in frigid, Arctic waters, the difference between mission success and failure for any workboat can be the equipment assigned to the task. Operators now have another choice for their Arctic operational needs.

The ProZero 10m Arctic Workboat … at a glance

LOA: 10.08 meters	Propeller: 24", 19" Pitch, 4 blade fixed	Maximum load: 1.000 kg
Beam Overall: 3.75 meters	VHF radio: RayMarine RAY218E Ray70	Paint: Hempel (hull & decks)
Draft (full load): 1.22 meters	Compass: Plastimo Offshore 135	Chartplotter: RayMarine eS127
Capacity: 2 persons	Engines: Volvo Penta D6-370/DP	Deck Hatches: Freeman Marine
Speed (cruise): 12 KT	Range: 8 hours (cruise speed)	Fuel capacity: 600 liters

Matson Signs NASSCO Con-Ro Contract

Matson Navigation Company has signed a contract with General Dynamics NASSCO to build two new combination container and roll-on/roll-off ("Con-Ro") vessels for its Hawaii fleet at a contract price of $511 million for both vessels with deliveries scheduled for the end of 2019 and mid-year 2020. The Kanaloa Class vessels will be built on a 3,500 TEU vessel platform, which is 265 meters long, 34.9 meters wide (beam), with a deep draft of 11.5 meters and enclosed garage space for up to 800 vehicles. In addition, the new vessels will have state-of-the-art green technology features, including a fuel efficient hull design, environmentally safe double hull fuel tanks, fresh water ballast systems and dual-fuel engines, meaning that they will be able to operate at speeds up to 23 knots on either conventional fuel oils or liquefied natural gas ("LNG") with some adaptation for LNG. These advancements are important to Hawaii as a means to reduce fuel consumption, and will result in significant emissions reductions over time.

New Custom Dredge from DSC

The winter of 2016 was an unusually harsh one for the Santa Cruz Small Craft Harbor in Santa Cruz, California. Fortunately for the harbor members and visitors, a new dredge from DSC Dredge, LLC – the "Twin Lakes" – was scheduled for delivery in June. Sharing the cost of a new dredge with the federal government, the District took delivery of the Seabright in 1986. The Twin Lakes, commissioned from DSC in April 2015, was christened on July 20 this year. It is a custom-built, 16" x 16" dredge with a hull-mounted pump. It features a PLC operating system with color touch-screen controls, Global Positioning System (GPS), electro-proportional hydraulic circuits, high-capacity service water system and an inline direct marine-style transmission for dredge pump gear ratio reduction. A planetary winch provides the swing operation. A magnetic flow meter shows the operator the velocity of the material being

moved, providing information on the dredge's efficiency. With two engines – a Caterpillar C32 dredge pump marine diesel engine and a Caterpillar C18 marine diesel-powered electric generator – the dredge fully complies with federal EPA and California CARB environmental standards.

Metal Shark to Build NYC Passenger Ferries

Louisiana-based shipbuilder Metal Shark has been selected by HNY Ferry Fleet, LLC, operator of New York City's Citywide Ferry Service, to build 26-meter, 149-passenger aluminum high-speed ferries. Metal Shark will produce a series of ferries at its Franklin, Louisiana shipyard. The new Citywide Ferry service is set to launch in the summer of 2017. A new fleet of passenger ferries operating six routes over 60 miles of waterways will connect New Yorkers and visitors to waterfront communities across the boroughs, , servicing over 4.6 million passenger trips annually and integrating into the city's overall transportation network. The ferries produced by Metal Shark will utilize an Incat Crowther USCG Subchapter T design that delivers a 25-knot operating speed while reducing environmental impact by incorporating low emission engines and low wake technology. The bicycle and stroller-friendly vessels are ADA-compliant and boast 360-degree views. Passenger amenities include onboard WiFi, power ports for small electronics such as computers and cell phones, and large LED infotainment screens. The first new vessel is expected to be delivered in the first quarter of 2017.

Argosy Cruises Taps AAM for 500 Passenger Tour Boat

All American Marine, together with Argosy Cruises of Seattle, WA, has announced the signing of a contract for the construction of a 125' aluminum monohull for operation in Puget Sound's Elliott Bay. This project will mark the first keel laid at All American Marine's new shipyard currently under construction in Squalicum Harbor at the north edge of Bellingham Bay. AAM will to open the new state-of-the-art 57,000-sq. ft. boat building facility in January 2017. The Port of Bellingham is developing the new site to further support AAM's ability to take on and pursue larger vessel projects with hulls over 100' in length alongside their regular production of mid-sized monohulls and catamarans. The new monohull will be certified under the latest U.S. Coast Guard Subchapter-K regulations to carry 500 passengers. Argosy selected AAM and Teknicraft Design as the leaders in building high quality and fuel efficient aluminum vessel designs. Passengers will enjoy panoramic windows from both the main deck and second deck cabins. The versatile floor plans of each cabin will offer both fixed and configurable interior seating, elevator accessibility, and fully-equipped service bars. The second deck aft viewing veranda and spacious bow foredeck will provide perfect platforms for capturing snapshots of Mt. Rainier and the Seattle cityscape. The upper deck features a 360-degree viewing experience, complete with elevated observation and ceremony platform. The vessel will be powered with twin Scania DI 16-080M engines and auxiliary power will be supplied via Northern Lights 65kW and 40 kW generators.

Pocket Tanker for Puget Sound

The Global Provider, Maxum Petroleum's newest vessel is currently under construction at Jesse Co. in Tacoma, Washington and is expected to enter service in January 2017. Elliot Bay Design Group's (EBDG) scope for the project included concept and contract design, regulatory support and detail design. The EBDG Team is working closely with Jesse Engineering, the Washington based fabricator selected to undertake the build for this project. The 150,000-gallon self-propelled bunker ship balances performance with fabrication cost. For example, the cargo handling system allows this vessel to move segregated products, lube and fuel oil without cross-contamination. The tanker is scheduled for delivery in February 2017.

The Global Provider at a glance …

LOA: 126'-2"	Capacity MGO: 3	Engines: Cummins QSK-19M, 660 HP Tier III
Beam: 32'	Lube Oil Capacity: 24	Gears: Twin Disk model MGX-5202
Depth: 13' (to main deck)	Gensets: Northern Lights	Steering: Autonav Deflector Marine Rudders
Pumps: Blackmer	Hose Crane: Rapp Marine HP30 5F	Number of Cargo Tanks 6

San Francisco's First New Fireboat in 61 Years

Vigor recently delivered a state-of-the-art fireboat to the San Francisco Fire Department. Designed by Jensen Maritime and built at Vigor's Seattle shipyard, the fireboat is the first fireboat in 61 years to join San Francisco's fleet. The unique vessel is not only an exceptional firefighting tool but also a mobile pumping station powerhouse. It's capable of pumping millions of gallons of water directly from the Bay into the City's Auxiliary Water System. This critical feature will keep fire hoses flowing in the event an earthquake damages San Francisco's water mains. The new fireboat will be christened this month.

Mourning the Loss of
Helen Delich Bentley

Helen Delich Bentley, the feisty, highly respected maritime journalist, former Federal Maritime Commission chairman and five-term member of Congress, died in August at home following a bout with brain cancer. Throughout her 70-plus year career, Mrs. Bentley had tirelessly promoted two major issues: the advancement of America's industrial/manufacturing base and the maritime community that carried products to and from market-primarily through the Port of Baltimore. In 1945, The Baltimore Sun offered her a reporting position where, she initially reported on labor and union matters. She was then dispatched to the waterfront to revive coverage of the port. She had never seen a ship, or the ocean. It was a tough, male-dominated environment, but she loved it. She was also a skilled mediator between labor and management, and an energetic advocate for jobs and economic opportunity. An internationally recognized expert on maritime issues, Bentley pushed for fair trade and a strong national defense. Bentley is widely given credit for laying the groundwork for what is today known as the Maritime Security Program to provide adequate funding for American Flagged Cargo Ships. Today, this program has salvaged a major remnant of America's merchant marine. In 1969, then President Richard Nixon appointed Mrs. Bentley as Chairman of the U. S. Regulatory agency Federal Maritime Commission. Notably, she was a principal architect of the Nixon Administration's 1970 Merchant Marine Act.

Evans

Thomson

McCarthy

Shafar

Crowley's Evans Promoted to VP

Crowley Maritime Corporation last month announced that **Eric Evans** had been promoted to vice president of strategy. Evans, who most recently served as VP of finance and planning for Crowley business units, joined Crowley in 1987 as an accountant and manager of management reporting. Evans graduated from the University of Pennsylvania's Wharton School in 1987 and is a Washington State CPA.

Thomson Joins Morrison & Foerster

Morrison & Foerster announced that **Katie Thomson**, former general counsel of the U.S. Department of Transportation (DOT), has joined the firm as a partner. Thomson will chair the firm's Transportation Group, counseling transportation clients on regulatory matters, civil and criminal litigation, internal and governmental investigations, compliance issues, and cybersecurity matters. At DOT, Thomson was involved in numerous policy decisions, including improving crude oil transportation safety. She earned her B.A. from the University of Illinois and her J.D. from the University of Pennsylvania Law School.

McCarthy to Head Operations at GPA

The Georgia Ports Authority named **Ed McCarthy** as its new COO. McCarthy comes to Georgia from his latest post as chief operating officer for CMA CGM America. At CMA CGM, McCarthy oversaw an annual budget of $1.9 billion and led a team of 150 employees, managing more than 400 vendors in marine, rail, trucking and logistics. McCarthy obtained a degree from SUNY Maritime College, a diploma in terminal management at Lloyd's Maritime Academy at Kent College, Dartford UK, and a Masters in Business Administration from William & Mary University.

Torqeedo Grows North American Sales Team

Torqeedo last month welcomed **Mike Shafar** and **Jim Sinnott** as sales managers. Shafar is responsible for managing and growing Torqeedo's North American OEM, retail and distribution business. Prior to joining the company, he spent 14 years in national advertising sales. Sinnott is tasked with strengthening and supporting the company's dealer network. With over 20 years of experience, he previously managed a sales force of over 150 in the wireless industry.

Bolien Changes Roles at YANMAR America

YANMAR America has announced that **Zack Bolien** will transition from his current role of Parts Marketing Specialist to Digital Marketing Specialist. The Digital Marketing Specialist is a new position created in an effort to support YANMAR's premium brand initiative, as well as to provide more solutions using the latest technology. Bolien has served YANMAR America's marketing team since December 2013.


Sinnott


Bolien


Bench


Lorenc


Kirchhofer

Bench Named Win-Tron National Sales Manager

Win-Tron Electronics recently named **Gerald (Jerry) Bench II** to the position of National Sales Manager. Bench joined Win-Tron Electronics in February 2015, having previously worked in the automotive industry. He also has retail, wholesale, business development, sales, marketing and purchasing experience. He began his career in 1982 at E&B Marine.

Bristol Harbor Group Welcomes Lorenc

Bristol Harbor Group (BHGI) recently introduced **Jennifer Lorenc** as its most recent addition to its naval architecture and marine engineering practice. Jenny is a recent graduate of Webb Institute where she received a Bachelor's of Science in Naval Architecture and Marine Engineering. At Webb, Jenny completed five internships, including time spent at JMS Naval Architects, and Vigor. She is a member of SNAME and The Institute of Marine Engineering, Science, and Technology.

Fidelis Group Holdings, LLC Hires Kirchhofer

Fidelis Group Holdings, LLC (FGH), with its subsidiary Continental Underwriters, Ltd., announced the hiring of **John Kirchhofer** as Vice President of its Marine Division. Kirchhofer will be responsible for expanding the group's Brown Water Hull and Primary Marine Liability geographical footprint, which will complement FGH's


Quéru


Davis


Stuart


Shapiro


Dunigan


Kunin

national Inland Marine and Ocean Cargo product lines. He comes to FGH with over 20 years of experience in the marine industry, most recently as National Hull Manager and Senior Underwriter for XL Catlin.

Navico Adds Two to Management Team

Nicolas Quéru has been appointed to lead Navico's Commercial Marine Division. Quéru has been made EVP Managing Director following his promotion from Vice President, Commercial Marine EMEA. **Stephen Davis** has been appointed Simrad Global Brand Director within Navico's marketing team. Prior to Simrad, Davis's most recent position was with American Airlines, where he led global marketing strategy.

OceanLED adds to Global Leadership Team

OceanLED announced two new key staff appointments to its global leadership team. **Charlie Stuart** has joined the company as Global Managing Director, and **Lindsay Shapiro** joins as the new Marketing Manager. Stuart was formerly General Manager of the Light Corporation and recently completed his Executive MBA. Shapiro, in addition to her corporate roles, serves on committees and Boards for over a dozen different charities.

Pettit Strengthens Technical Sales Staff

Pettit Marine Paint announced the addition of **George Dunigan** to its Technical Sales Team. Dunigan will be responsible for bolstering customer retention efforts and developing new relationships. A NACE International Institute-certified coatings engineer, Dunigan has received comprehensive training and has demonstrated significant experience in topside paints and antifouling coatings.

Harrington Hoists Promotes Kunin

Harrington Hoists, Inc., has announced the promotion of **Brett Kunin** to Midwest Regional Sales Manager. Kunin, who began his sales career with Harrington in the St. Louis territory, will oversee Harrington's Midwest Sales team.

Bouchard Hosts USCG Leadership & Managerial Skills Course

Bouchard Transportation Co. recently partnered with SUNY Maritime College and privately hosted the required USCG Leadership & Managerial Skills Course at Bouchard's corporate headquarters in Melville, NY for all Bouchard Tug Captains & Chief Engineers. Effective March 24, 2014, additional training and/or assessments became required for certain Standards of Training, Certification, and Watchkeeping (STCW) endorsements. Bouchard's private course ensures that requirements are met for all management level (Captains) and CEO (Chief Engineer Officer) vessel employees before December 31, 2016.

Lloyd's Register, MarineCFO to Provide Turnkey SubM Services

Lloyd's Register North America announced its intention to assume Subchapter M Third Party Organization duties. This message was followed by the signing of an exclusive Subchapter M joint marketing agreement between Lloyd's Register and workboat technology provider MarineCFO, bringing the two groups together to provide comprehensive solutions for compliance with Subchapter M.

CA Shipbuilding & Repair Supports Nearly 35,000 Jobs

Shipbuilders Council of America member General Dynamics NASSCO hosted Maritime Administrator Paul Jaenichen for a tour of the San Diego-based shipyard, where SEACOR Constitution – a 610-foot tank ship – launched in late August. California is the 5th highest state in total private sector direct employment for shipbuilding and repair and shipbuilding in California supports 35,000 jobs, and contributes $2.3 billion in labor income and $3.6 billion in U.S. GDP. "The Administrator's remarks while visiting NASSCO demonstrate not only the local importance of the shipbuilding and repair industry for California, but also the critical support on a national level the shipyard industrial base provides to economic and national security," said SCA's President, Matthew Paxton.

Bouchard Transportation Co.

Chris Desmond (LR), Dean Shoultz (MCFO), Rafael Riva (LR), Michael Klein-Urena (LR) and David Hanowski MCFO

Paxton

Jaenichen

Crowley Launches Box Service between Jacksonville and Costa Rica

Crowley Maritime Corporation last month announced today that it is launching a new, weekly, fixed-day container shipping service between Jacksonville and Costa Rica. The two container ships in the service will make port calls in Jacksonville on Thursdays, Port Everglades, Fla., on Fridays, and arrive in Puerto Limon, Costa Rica, on Wednesdays. Northbound Crowley will sail from Costa Rica on Fridays, which is an attractive end-of-the-work-week sailing for perishables shippers.

Great Lakes, Seaway YTD Traffic Results Mixed

"We are about half-way through the 2016 navigation season and our overall cargo tonnage numbers are down by 11 percent," said Betty Sutton, Administrator of the Saint Lawrence Seaway Development Corporation. "The lack of iron ore and coal has definitely been a contributing factor for this decrease; however international traffic continues to be well above the five-year average, keeping our ports and their workforce busy." The St. Lawrence Seaway reported that year-to-date cargo shipments for the period were down 13.2 million metric tons over the same period in 2015. Nevertheless, Great Lakes-St. Lawrence Seaway shipping rebounded in August due to a surge in U.S. grain exports, iron ore shipment im-


Credit: Chamber of Marine Commerce

Algoma Harvester

Benzie

Ardent Salvage

Smith

provements and a steady flow of raw materials for manufacturing and construction. And, year-to-date domestic general cargo shipments are up 23 percent compared to last season. The Port of Green Bay, for example, benefited from the brisk activity with monthly cargo up 16.7 percent compared to the same month in 2015. Separately, the Lake Carriers' Association reported an increase in iron ore on the Great Lakes and St. Lawrence Seaway of 2.9 percent compared to a year ago. However, those shipments trailed the month's 5-year average by 5 percent.

IMCA Welcomes IMO BWT Convention Ratification

The International Marine Contractors Association (IMCA) last month welcomed the news that the Ballast Water Management (BWM) Convention enters into force on 8 September 2017, and has produced a 12-point information sheet on the Convention for its members. Referring to the newly ratified convention, "This is a significant environmental development, which provides certainty with regard to a definite implementation date," said IMCA's Technical Director, Richard Benzie. See the information sheet at: **www.imca-int.com**

USCG Policy Letter for Conditional Occupancy of Unmanned ATB Barges

The Coast Guard's Office of Commercial Vessel Compliance last month released policy letter 16-04 to provide guidance to Coast Guard Officers and the marine industry on the circumstances under which personnel may conditionally occupy an unmanned barge that forms part of an ATB combination. The policy letter is applicable to barges with an unmanned load line operating beyond the Boundary Line, or on the Great Lakes. View the entire policy letter at: **https://www.uscg.mil/hq/cgcvc/cvc/policy/policy_letters/CVC/CG-CVC_pol16-04.pdf**

Ardent responds to OPA-90 Vessel Fire in Puerto Rico

On Aug. 17, a fire broke out on the vessel, the Caribbean Fantasy. The Vessel Response Plan was activated. The Caribbean Fantasy is covered under Ardent's OPA-90, Salvage and Marine Fire Fighting "SMFF" coverage program. Ardent responded to the incident on board the vessel. McAllister Towing was one of Ardent's OPA-90 partners that assisted in responding with two of their z-drive tractor tugs, Brooklyn McAllister and, Beth M. McAllister. Puerto Rico Towing and Barge and Moran Towing also provided tugs for the operation. Ardent demobilized emergency response personnel and equipment one week after (Aug. 25) the successful operation, and handed the vessel back to the ship owner.

OSVDPA Accredits TMTI for DP Training

The Offshore Service Vessel Dynamic Positioning Authority (OSVDPA) announced that the Marine Training Institute (TMTI) in Gray, Louisiana is the first training provider to be accredited to conduct OSVDPA dynamic positioning operator (DPO) training courses and assessments. The OSVDPA's executive director, Aaron Smith, said: "We were very pleased with the professionalism and expertise exhibited by TMTI. Throughout our accreditation process, every member of their team proved their commitment to upholding the highest standards and a dedication to training and certifying DPOs."

26 Hours of Data Recovered from El Faro VDR

The National Transportation Safety Board intends to develop a detailed transcript of the sounds and discernible words captured on the El Faro's bridge audio, following the audition of the ship's VDR. The voyage data recorder from El Faro, a US flagged cargo ship that sank during Hurricane Joaquin in October 2015, was successfully recovered from the ocean floor and transported to the NTSB's laboratory. Information from the El Faro's VDR was successfully recovered August 15. About 26 hours of bridge audio, weather data and navigational data was recovered from the VDR, which was said to found in good condition.

SkimOil's Mini-BRUTE OWS

SkimOil's Mini-BRUTE oily water separator (OWS) has USCG approvals and meets IMO/MEPC 107 (49) requirements. It comes ready to install, with pump, controls, filters and an oil content monitor-alarm (OCM) that logs every discharge. The Mini-BRUTE's ability for oily bilge water treatment at less than half the size and cost of any other oily water separators is ideal for workboats.

www.Mini-Brute.com

Cummins C Command Elite Plus System for QSK95

Cummins' C Command Elite Plus classed panel system for the company's QSK95 engine is a modular selection of instrumentation and control panels engineered to help marine operators protect and enhance engine operation and manage operating costs, by logging critical operating parameters and providing diagnostic information. Each display is easily configurable, and allows for flexible data presentation, readable in variable lighting conditions.

www.cummins.com

Stone Marine Marine Seals

The EcoSeal, which is a main shaft seal, is now being joined by two additional seals designed specifically for the thruster and azipod markets, the EcoSeal T and EcoSeal TS. The new seals have the same benefits as the original EcoSeal. The EcoSeal TS is a split version of the EcoSeal T which makes for an easy retrofitting solution and can be fitted into very tight spaces.

www.stonemarineseals.com

Counterbalanced Hinge for Lids & Panels

Southco's hinge is designed to assist the lifting and positioning of heavy lids and panels is designed with an integrated spring system, allowing a heavy lid to be lifted with minimal operating effort, and will continue to hold it securely in any position. CA Counterbalance Hinges can be fine-tuned to the feel of the lid or panel, eliminating the need for constant maintenance and re-adjustment.

www.southco.com

High Power, Compact Package from Yanmar's 6AYEM

Yanmar Europe's new common-rail commercial marine engine, the 6AYEM, is suited for those looking for an engine which complies with existing IMO/EPA/CCNR emissions limits and offers the capability of meeting future environmental requirements, including IMO Tier III and EPA Tier 4. Key features of the 6AYEM include high output, compact dimensions, easy maintenance, and all inspection ports readily accessible.

www.yanmar.com

Schwarze-Robitec's Cold-Pipe Bending Machine

To optimize the limited space available inside workboats, the bending radii of pipes must be kept very tight. Boatbuilders require systems that enable the production of pipes with very small bending radii. Schwarze-Robitec's pipe cold bending machine CNC 220, as a component of their Heavy Duty production line, offers its customers from the shipbuilding and offshore industry maximum flexibility.

www.schwarze-robitec.com

CAT's Marine Asset Intelligence, SpecTec Collaborate to Cut Costs

Caterpillar Marine Asset Intelligence and maintenance management specialist SpecTec have combined to reduce ship maintenance costs by enabling unnecessary maintenance to be deferred for equipment that is operating properly and identifying potential failures. The integrated solution utilizes onboard sensor data that is automatically gathered and analyzed by the Cat Asset Intelligence predictive analytics platform, and then integrated into SpecTec's computerized maintenance management system, AMOS.

www.cat.com/marine

Selektope Antifouling Marine Coatings

The first branded marine coatings to feature the antifouling ingredient Selektope have been launched by Chugoku Marine Paints. Selektope's pharmacological action repels barnacle settlement on ships' hulls by temporarily stimulating the barnacle larvae's swimming behavior. CMP's new generation 'SEAFLO NEO' range of antifoulings make the Selektope solution available as a high performance product for mainstream operations, under two separate brands: Seaflo Neo CF Premium; and Seaflo Neo-S Premium.

www.i-tech.se

Teekay Axilock Fire Proof Coupling

The Teekay Fireproof Coupling features patented, internal fire sleeves that cannot be lost, damaged or removed. The enhanced Axilock Fire Proof Coupling replaces the original internal fire sleeve with layers of advanced fire proof material. It also gives a more positive lock off on torque. Current test conditions require couplings to be subjected to temperatures in excess of 800 degrees, which Axilock Fire Proof resists with ease.

www.teekaycouplings.com

Raytheon Anschütz launches Standard 30 MF Gyro Compass

The new Standard 30 MF gyro is a second generation of maintenance-free gyro compasses from Raytheon Anschütz. It provides highly accurate heading, rate-of-turn, roll and pitch information. Featuring an ultra-robust design and offering superior lifetime performance, Standard 30 MF settles at rough-seas and provides heading output even if speed and latitude input fails. With Ethernet and CAN-bus interfaces, cabling efforts are minimized.

www.raytheon-anschuetz.com

Oxifree Global unveils Polymelt Service Gun at ONS

The Polymelt Service Gun (SG1) was developed to allow a way of filling in small areas of Oxifree TM198 coating which have been removed for inspections, making field maintenance easier and cost effective. Oxifree Global developed Oxifree TM198, Oxitape and the SG1 to tackle the global corrosion epidemic which ravages the offshore industry. Oxifree TM198 thermoplastic coating is a patent protected, organic, self-lubricating coating for the protection of metal components.

www.oxifree.com

Sherwin-Williams Launches YouTube Channel

Sherwin-Williams Protective & Marine Coatings has launched a YouTube channel to share helpful videos covering company product and service offerings. The channel expands the division's social media presence and offers a new way to share how Sherwin-Williams helps protect assets around the globe. The Sherwin-Williams Protective & Marine Coatings YouTube channel will feature videos related to a wide array of markets, including oil, gas, and marine.

www.youtube.com/user/SherwinWilliamsPMC

Reverse Part Number Lookup Function for Online MIG Gun

Bernard and Tregaskiss have introduced a new reverse part number lookup function for their semi-automatic and robotic MIG gun online configurators – online tools that allow users to customize a MIG gun for their exact needs, by selecting amperage, neck style and angle, consumables and more. The new time-saving reverse part number lookup function provides users with the complete replacement parts list for previously configured MIG guns.

www.BernardWelds.com

100 Amp Cables Deliver Reliable Power

Reliable shore power connections are essential. Hubbell Marine offers U.S.-made, 100 amp, marine grade ship-to-shore Cable Sets in 3, 4, and 5 wire configurations. The Cable Sets utilize high visibility yellow STOW cable that's 105°C rated and UL listed to meet global safety standards worldwide. Watertight, ABYC-compliant and fully corrosion-resistant, they come in 75', 100' and 125' lengths to suit a range of applications.

www.hubbell-marine.com

Extreme Boat Lifts from Golden Boat Lifts

Golden Elevator Lifts are ideal for canals, embankments and other narrow locations where pilings are absent. They can be engineered to run true vertical or on a diagonal, as the site demands. For 30 years, Golden Boat Lifts has built reliable boat lifts in a wide range of safe and easy-to-operate models, for vessels up to 250,000 lbs. The company is ISO 9001:2008 certified and CE approved.

www.goldenboatlifts.com

Maximum Ventilation for Peak Performance, Safety

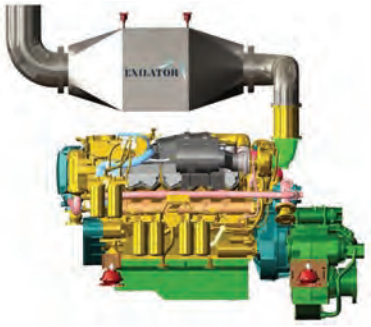
All Delta "T" fans and blowers are built specifically for a marine environment; they're not adapted from another industry. With ignition-protected operation, they're ideal for both diesel and gasoline powered vessels. Available in 12 and 24VDC, they feature continuous-duty ratings, enclosed double shielded ball bearing motors, stainless steel shafts with O-ring seals, dynamically balanced armatures, and quiet, vibration-free operation.

www.deltatsystems.com

ExiLencer: Marine Diesel Emissions Control System

Airflow Catalyst Systems and Exilator offer ExiLencer to the marine industry under the product name ExiLencer. Tested for nearly 12-months at sea, ExiLencer removes 98% of particulates or soot, 99% of highly toxic Carbon Monoxide (CO), and completely removes the smell of diesel. In addition, the catalyst reduces NOx emissions, while the silencer reduces exhaust noise by up to 35 decibels.

www.exilator.com



WESMAR Introduces DSP5000 Wave-Smart Stabilizers

WESMAR's DSP5000 Wave-Smart Stabilizers change the way you measure comfort. Among other advances, it introduces WESMAR's proprietary Continuous Feedback Adaptive Controller (CFAC) technology. The new DSP5000 series is available on all new systems plus as an upgrade to existing WESMAR Stabilizer systems and many competitor units. It offers faster response, smoother stops, ease of installation, and replaces chasing and wasted energy and noise.

www.wesmar.com

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Work Phone : 228-762-5700
Houston, Texas, United States

Job description
Signet Maritime Corporation has an immediate opening for an Assistant Manager, Marine Operations, U.S. East Coast & Caribbean for Jacksonville Fleet Operations. The successful candidate must be self-motivated, have an excellent driving record, advanced computer skills and a bachelor's degree. A USCG License and Maritime tugboat experience is required.

Duties and Responsibilities
- Create a safety culture throughout the organization;
- Assist Manager with implementing policies and procedures by performing personnel functions such as hiring, interviewing, evaluating, and training;
- Recommend operational changes to Ocean Towing Manager;
- Oversee and manage the Marine Superintendents work and scheduling;
- Provide operational and technical management oversight of all vessels in Jacksonville;
- Coordinate with employees, surveyors, inspectors and other parties to ensure the vessels comply with local, national, and international rules, laws and regulations together with classification requirements;
- Monitor fleet performance to ensure vessels are serviced, maintained and records are kept up-to-date in respect to hull, machinery and technical matters. To be completed in conjunction with the Ocean Towing Manager and Engineering;
- Review the purchase of spares parts, stores, new equipment and services;
- Review disbursement accounts with respect to supplies and technical expenditures;
- Assist Captains in the daily operations of the vessels and with crew management, crew changes, and rotational travel;
- Assist Manager with special projects by interacting with customers and outside vendors, performing cost analysis estimates, preparing schedules, and reviewing finished work and payments;
- Assist Manager in preparing employee performance appraisal reports;
- Recommend competency and licensing profiles for marine personnel to Human Resources;

Qualifications
- Bachelor Degree is required with minimum GPA of 3.0;
- Extensive experience sailing tugboats is required, sailing as Captain on ocean going tugs is preferred;
- Familiarity with Jacksonville to Puerto Rico and Dominican Republic ports and transits is preferred;
- An active USCG License is required;
- A valid driver's license and good driving record is required.
- Only candidates within the USA

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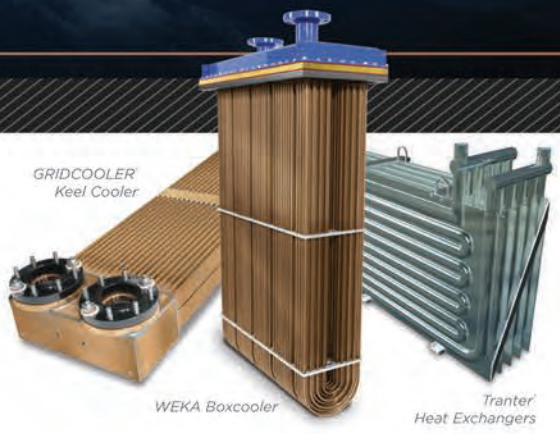

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